MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The REVIEW for November, 1895, is based on reports from 2,759 stations occupied by regular and voluntary observers, classified as follows: 149 from Weather Bureau stations; 35 from U. S. Army post surgeons; 2,416 from voluntary observers; 33 from Canadian stations; 96 received through the Southern Pacific Railway Company; 30 from U. S. Life-Saving stations; international simultaneous observations are received from a few stations and used together with trustworthy newspaper extracts and special reports.

The WEATHER REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe. Unless otherwise specifically noted, the text is written by the Editor, but the statistical tables are furnished by Mr. A. J. Henry, Chief of the Division of Records and Meteorological Data. A special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada.

CLIMATOLOGY OF THE MONTH.

GENERAL CHARACTERISTICS.

During November the mean temperature was in excess throughout the Atlantic States and Lake Region. The precipitation was also in excess in New England and thence westward over the Lake Region and Ohio Valley. The principal storm of the month was that which passed from the Gulf States on the 24th northeastward over the Lake Region on the 25th, and with respect to which a special bulletin was published. Local storms, properly so-called, such as belong especially to the warm season of the year, were not reported during November. The drought that has prevailed during some months throughout the Mississippi basin was ended by the general rain of this month but, on the other hand, precipitation was below the normal in the Rocky Mountain and Pacific Coast regions. The auroral display between the 9th and 12th was reported as one of the brightest on record. The rivers continued near or below the low water mark, but the Ohio rose slightly. The Mississippi in Minnesota and the Missouri in North and South Dakota were generally frozen over before the close of the month.

ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level, as shown by mercurial barometers, not reduced to standard gravity, and as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart II. That portion of the reduction to standard gravity that depends on latitude is shown by the numbers printed on the right-hand border.

The *mean pressures* during the current month were highest in the middle Plateau Region, and nearly as high in the middle portion of the Appalachian region. A region of high pressure extended from Oregon southeast to the Gulf of Mexico and thence northeast to Newfoundland. The highest were: Idaho Falls, 30.25; Lander, 30.24; Winnemucca and Salt Lake City, 30.22: Carson City, Knoxville, Chattanooga, Raleigh, Lynchburg, Washington, and Harrisburg, 30.21; Parkersburg, 30.20. Mean pressures were lowest in Arizona, and also in Manitoba and Saskatchewan. The lowest were: Yuma, 30.00; San Diego and Los Angeles, 30.02; Havre, 30.05; St. Vincent, Duluth, and Marquette, 30.06.

As *compared with the normal* for November the mean pressure was in excess throughout the Lake Region and Atlantic States. The greatest excesses were: St. Johns, 0.19; Sydney, 0.18; Eastport, 0.17; Halifax and Bermuda, 0.16. Pressures were slightly deficient in the Plateau Region and middle Rocky Mountain Slope; the greatest deficits were: Calgary, 0.05; Havre, 0.04; San Diego and Rapid City, 0.03.

As *compared with the preceding month* of October, the pressures, reduced to sea level, show a decided rise over the Rocky Mountain and Pacific Coast regions, and a still larger rise over the Atlantic States and Lake Region. The greatest rises were: Eastport, 0.16; Portland, Me., and Nantucket, 0.15; Northfield, Boston, Block Island, New Haven, Sault Ste. Marie, and Yuma, 0.14. The greatest falls were: Concordia, 0.04; Kansas City, Springfield, Mo., Wichita, Dodge City, Havre, and Tatoosh Island, 0.03.

AREAS OF HIGH AND LOW PRESSURE, NOVEMBER, 1895.

By Prof. H. A. HAZEN.

The accompanying table exhibits some of the salient features of the place of origin and disappearance of highs and lows during November, whereas Charts I and IV show the paths in detail. There were but four highs and ten lows during the month of sufficient definiteness to be numbered. In previous studies of these conditions (WEATHER REVIEW, 1888, p. 246, and 1890, pp. 173, 174), I have shown that the velocities of the high and succeeding low have been fairly comparable, and seemed to show a common cause for the movement. During the current November, however, there is no similarity whatever in the figures. The average duration of highs has been 9.4 days, and of lows only 2.2 days. The velocities were 21, and 34 miles per hour, respectively, for the two conditions.

The table, however, does not show the actual velocity of highs while moving from the Rocky Mountains to the Atlantic Ocean. It is well known that highs very frequently delay for days at a time in the great Plateau regions of the west, and also off the south Atlantic Coast. An examination of Chart IV will show clearly this bunching of the highs, and it will also show that after the motion was fairly well started the lines joining points at 12-hour intervals in the paths do not differ very widely in length for either highs or lows.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	1, a. m.	38	92	9, a. m.	29	78	3,220	8.0	402	16.8
II	3, p. m.	51	115	15, a. m.	46	59	4,680	11.5	407	16.9
III	12, p. m.	41	126	23, a. m.	45	60	6,440	10.5	613	25.6
IV	21, a. m.	54	113	28, p. m.	41	71	4,610	7.5	615	25.6
Sums							18,950	37.5	2,037	
Mean of 4 paths									509	21.0
Mean of 37.5 days									505	21.0
Low areas.										
I	1, a. m.	29	80	3, a. m.	44	63	1,500	2.0	750	31.2
II	2, p. m.	41	116	4, p. m.	50	94	1,460	2.0	730	30.4
III	4, a. m.	39	112	5, p. m.	50	96	1,360	1.5	907	37.8
IV	9, a. m.	46	83	10, p. m.	46	58	1,325	1.5	883	36.8
V	13, a. m.	46	101	14, p. m.	50	85	1,245	1.5	830	34.6
VI	16, a. m.	53	105	18, p. m.	50	63	2,000	2.5	800	33.3
VII	18, p. m.	39	94	21, p. m.	48	60	2,055	3.0	685	28.6
VIII	22, a. m.	35	96	23, p. m.	47	72	1,510	1.5	1,007	42.0
IX	24, a. m.	26	96	26, p. m.	49	71	1,525	2.5	610	25.4
X	26, p. m.	50	125	30, a. m.	47	59	3,490	3.5	997	41.5
Sums							17,470	21.5	8,199	
Mean of 10 paths									820	34.2
Mean of 21.5 days									813	33.9

HIGH AREAS.

I. This high is found central over Missouri on the first day of the month. Its motion was toward Lake Ontario, which it reached on the morning of the 2d. It remained nearly stationary off the middle Atlantic Coast for five days, and then moved to the Florida coast, where it disappeared on the morning of the 9th. The highest pressure observed was 30.66 at New York on the morning of the 4th. No temperature falls of any conseqnence accompanied this high.

II. Was first noted to the north of Montana on the evening of the 3d. Its motion was extremely slow for six days when it reached Nebraska. On the morning of the 10th it reached Missouri, and from there it moved in a northeast direction down the St. Lawrence Valley, and disappeared off Nova Scotia on the 15th. The highest pressure recorded was 30.68 over Nova Scotia on the evening of the 14th. The greatest fall in temperature was 44° at Huron on the morning of the 6th.

III. This was the only high that originated off the California coast during the month. It was first noted on the evening of the 12th. It advanced due east to Nevada in the next twenty-four hours, and remained stationary there for nearly five days. On the evening of the 18th either a portion of the air from this high was transferred to the north of Montana or else a new high started in at that point. In the next two days, either by a system of motions or transferences, this high had changed position to the central Gulf of Mexico. Thence it moved along the Atlantic Coast, reaching Nova Scotia on the morning of the 23d. The motions or transferences of this high were extremely erratic as this description shows. It is an open question whether there was any actual motion of any definite atmospheric condition or not; it is certain that there was no actual motion of any body of air that might have been found on the Pacific Coast on the 13th. On the 18th heavy snows occurred near the center of the high to the north of Montana, amounting to 7 inches at Prince Albert in twelve hours. It has been noted that in this region fully half of the precipitation occurs in the rear of storms and in the forefront of advancing highs, conditions under which we have, in the eastern part of the country, our clearest and driest weather. This anomalous condition is, I think, not due to easterly winds in the rear of the low blowing from Hudson Bay and carrying moisture from that great body of water to this arid region. The body of water is not sufficient to produce such marked efforts at distances of 1,200 or 1,500 miles. It is probable that moisture from the Pacific Ocean influences the air in these high layers, and there is a condensation of moisture through a great cooling. There would be a strong tendency to an increase of moisture through the westerly upper air currents blowing from the Pacific toward the storm. It should be noted that in no case are these rains excessive in highs, or to the rear of lows, but they are mostly sporadic in their character. As the storms approach the Mississippi Valley the precipitation gradually dries out from the rear of the storms and shifts to the front, being fed by the moister air from the Lakes and Gulf. Nor further precipitation is noted in this high in its march or change of position to the sea. The highest pressures noted were 30.70 to the north of Montana on the evening of the 18th, just at the time of the snows mentioned above, and 30.74 at Sydney on the morning of the 23d.

The greatest fall in temperature occurred in Missouri on the evening of the 19th and was 32° in twenty-four hours. It should be noted that the cold wave in the upper air which had advanced between this high and the preceding low No. VII continued to advance notwithstanding the apparent stoppage of the high or its detour by the Gulf of Mexico. A fall of 40° in twenty-four hours was reported from Vermont on the morning of the 21st.

IV.—This high appeared to the north of Montana on the morning of the 21st; sporadic snow amounting to 1 inch occurred at Bismarck in twelve hours by the evening of the 21st. At first its change of position was toward the south-southeast for two days then it remained nearly stationary two and one-half days in Wyoming, then moved to Texas; recurving, it moved northeast, reaching Long Island Sound on the evening of the 28th. The highest pressure reported was 30.70 at Washington, D. C., on the morning of the 28th. The greatest fall in temperature occurred on the evening of the 22d and was 46° in northern Texas.

LOW AREAS.

I.—This low was noted on the 1st off the Atlantic coast of Florida. It disappeared off Nova Scotia on the 3d not having moved into the interior. The heaviest rain was at Nantucket, 0.86 in twelve hours.

II.—This was first noted in Nevada on the evening of the 2d. Its motion was east and northeast disappearing or fading out in Manitoba the evening of the 4th. Almost without rain, except a little on the last day at Duluth. Lowest pressure, 29.60, at Huron, S. Dak., on the evening of the 3d.

III.—On the 3d, p. m., the former low had caused a trough or depression extending to the southwest, and the next morning III started in Utah, with a pressure of 29.62 at Salt Lake City. This storm also moved in exactly the same path as its predecessor and disappeared in Manitoba the evening of the 5th. Light rain or snow occurred at its center. Lowest pressure, 29.36, at Winnipeg the evening of the 5th.

IV.—This storm developed in Ohio in a trough extending from the western Gulf to the lower Lakes on the morning of the 9th. It should be noted that this was the same trough in which III had developed six days before. The eastward advance of this trough had been greatly hindered by the very

slow advance of high No. I on the Atlantic Coast. After this storm was fairly well organized it advanced with great rapidity and disappeared off Nova Scotia on the morning of the 10th. The aforementioned trough continued to advance broadside forward giving heavy rains over a vast region and did not leave its final trace on the coast till the morning of the 13th, when it deposited 1.74 inch of rain at Hatteras in twenty-four hours. A wind of 56 miles per hour was reported at Hatteras on the evening of the 12th.

V.—This storm originated in Kansas on the morning of the 13th, though twelve hours before there had been rain in northern Texas and Kansas. It moved very rapidly in a northeast direction and disappeared to the north of Lake Superior the evening of the 14th; lowest pressure, 29.72, at Port Arthur the morning of the 14th.

VI.—This storm originated to the north of Montana on the morning of the 16th with a pressure of 29.56 at Battleford. Its motion was very rapid toward the east tending south and it disappeared in the Gulf of St. Lawrence the evening of the 18th; lowest pressure, 29.34, at Port Arthur the morning of the 17th. It was characterized by very slight rainfall during its progress and by rather moderate winds for the barometric gradients noted.

VII.—While No. VI was passing eastward a long trough was noted stretching toward the southwest to Texas. This trough was without precipitation, however, except at the extreme northeast end. On the evening of the 18th No. VII was first noted as a sort of condensation in this trough over Missouri. This storm also moved northeast with great rapidity and disappeared over Newfoundland the evening of the 21st. As it approached the coast its conditions became very much intensified, a pressure of 28.74 being noted at Chatham the morning of the 21st. Here, as in a previous case, the wind velocity, 47 miles at Block Island, was entirely incommensurate with the barometric gradients noted.

VIII.—This storm was a concentration of the conditions forming a trough stretching from Arkansas to the Pacific Coast. It first took shape in Arkansas on the morning of the 22d. Its motion was very rapid in a northeasterly direction to the St. Lawrence Valley, where it disappeared the afternoon of the 23d; rains accompanying were generally light; the heaviest was 1.48 of an inch in twenty-four hours at Cairo on the 23d; lowest pressure, 29.86, at Fort Smith on the morning of the 22d.

IX.—The trough from VIII stretched to the west Gulf, and there this (the only Gulf storm of the month) was energized or concentrated on the morning of the 24th, with a pressure of 30.02 at Galveston. This was by far the severest storm of the month, and was regarded as of sufficient importance to call for a Special Bulletin (No. 2 of 1895).

The following quotations are made from this Bulletin:

> The morning map of the 25th showed an extended trough of low pressure covering the lower Mississippi and Ohio valleys, with the center near Vicksburg, 29.68 inches. Storm signals were ordered for the lower Lakes and information signals on the upper Lakes, giving notice of this storm twenty-four and thirty-two hours in advance of dangerous gales.
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> The storm moved to the east of north at 33 miles per hour between the morning and evening reports of the 25th, causing heavy rains in the lower Ohio and Mississippi valleys, and heavy snows in the states north of the Ohio River. It was central at Louisville on the evening of the 25th. Considerable damage from high winds occurred in the Ohio Valley and Tennessee, but the storm did not reach its maximum intensity till the night of the 25th, when it passed from the Ohio Valley to the north of Lake Huron, moving at 75 miles per hour between 8 p. m. of the 25th and 8 a. m. of the 26th. This was one of the severest storms in the lower Lake region. Mean velocities were, at Detroit, 76, Cleveland, 72, and Erie, 60 miles per hour, and at Buffalo that night 68 miles per hour. The storm was followed by a cold wave throughout the lower Mississippi Valley on the morning of the 26th, which extended eastward to the Atlantic Coast on the morning of the 27th, causing freezing temperatures as far south as the central portions of the Gulf States, and frosts along the east Gulf Coast and in northern Florida.

Warnings for high winds and cold waves were fully sent out in the case of this storm.

X.—This storm seems to have originated very near the north Pacific Coast on the evening of the 26th. Its motion was generally eastward with a slight bend to the southward as it crossed the Mississippi Valley, reaching the Gulf of St. Lawrence on the morning of the 30th. The storm had but slight intensity and the precipitation was slight. Lowest pressure, 29.50, at Spences Bridge on the morning of the 27th. A disturbed region existed in the extreme northwest on the last days of the month, but the path of the storm was not definite enough to be charted.

LOCAL STORMS.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

The term "local" storm has been used in this chapter as applying to the phenomena of thunderstorms and wind gusts of more than usual severity. These may occur, in isolated cases, in groups, or they may be general over one or more States, but as a rule they die out with nightfall. The typical local storm is particularly a phenomenon of the warmer months of the year, and is rarely observed in its full development in winter. The caption "local" storm, is therefore not so appropriate as might be desired for the matter appearing herein during the colder months of the year.

The early part of the month was singularly free from storms of any description; on the 14th and 15th, however, considerable havoc was wrought on the Long Island and New Jersey coasts by high northeasterly gales and the heavy breakers accompanying a slight depression that passed along the coast on those dates. The damage to bulkheads, jetties and piers, was estimated to be very great.

The weather conditions on Sunday the 24th were unsettled. Rain was falling from the Mississippi Valley to the Gulf of St. Lawrence, and snow in western Nebraska, Kansas, and northern Texas. Rain was also falling on the Gulf Coast, but a definite storm center was not yet visible on the daily weather maps. The latter appeared, however, twenty-four hours later, and moved to the Great Lakes as a severe storm of wind, rain, snow, and sleet, whose boundaries extended from the eastern slope of the Rocky Mountains to the Atlantic Seaboard. Telegraphic and telephonic communication and railway traffic were interrupted in all sections covered by the storm. The wind in places reached a very high velocity and caused immense damage. In the oil fields of western Ohio alone the loss was estimated to have been $300,000. The storm was most severe in the central valleys and passed over the Lakes and beyond our boundaries on the 26th.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperature is given for each station in Table II, for voluntary observers. Both the mean temperatures and the departures from the normal are given in Table I for the regular stations of the Weather Bureau.

The *monthly mean temperature* published in Table I, for the regular stations of the Weather Bureau, is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table IV for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution* of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain Plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the

country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean* temperatures were: Key West, 74.8; Jupiter, 72.0; Titusville, 70.0. The *lowest mean* temperatures were: In the United States, St. Vincent and Williston, 20.0; Bismarck, 22.2; and in Canada, Prince Albert, 14.0; Minnedosa, 14.4; Qu'Appelle, 16.2; Winnipeg, 16.8.

As *compared with the normal* for October the mean temperature of the current month was in excess in the Middle States and New England, but elsewhere generally deficient.

The greatest excesses were: New Brunswick, 3.2; Vineyard Haven, 3.0; Boston, 2.7; Nantucket, 2.6; Eastport, 2.4. The greatest deficits were: Williston, 7.9; Bismarck, 6.7; Rapid City, 4.0; Pierre, 3.4; Abilene, 3.3.

Considered by districts the mean temperatures for the current month show departures from the normal as given in Table I. The greatest positive departure was: New England, 2.1. The greatest negative departures were: North Dakota, 4.8; Abilene (southern Slope), 3.3.

The years of highest and lowest mean temperatures for November are shown in Table I of the REVIEW for November, 1894. The mean temperature for the current month was the highest on record at: Eastport, 39.8; Boston, 45.4; Nantucket, 47.2; Vineyard Haven, 48.8; Harrisburg, 44.0. It was the lowest on record at: Fresno, 52.8; Eureka, 48.8; and Baker City, 34.2.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: Los Angeles (18th), 94; Key West (10th), Yuma (19th), San Diego (15th), Red Bluff (6th), 85; Jacksonville (9th), Tampa (8th), 84. The lowest maxima were: St. Vincent (17th), 48; Idaho Falls (2d), Baker City (1st), Spokane (19th), Tatoosh Island (15th), 56; Santa Fe (21st), 57. The highest minima were: Key West (21st), 63; Jupiter (21st), 48; Port Eads (26th), 45; Tampa (21st), San Francisco (26th), 42. The lowest minima were: St. Vincent (29th), —16; Williston (8th), —14; Moorhead (22d), Lander (24th), —12; Bismarck (22d), —11.

The limit of freezing weather is shown on Chart VI by the isotherm of minimum 32, and the limit of frost by the isotherm of minimum 40.

The years of highest maximum and lowest minimum temperatures for November are given in the last four columns of Table I. During the current month the maximum temperatures were the highest on record at: Portland, Me., 69; Nantucket, 66; Albany, 70; Harrisburg, 75; Port Huron, 69; Green Bay, 68; Columbus, Ohio, 77; Parkersburg, 78; Norfolk, 80; Columbia, S. C., 83; Cincinnati, 78; Lexington, 78; Louisville, 79; Tatoosh Island, 62; Eureka, 74; San Francisco, 83. The minimum temperatures were the lowest on record at: Eureka, 32; Fresno, 29; San Diego, 38.

The greatest daily range of temperature and the extreme monthly ranges are given for each of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station. The largest values of the greatest daily ranges were: Pueblo, 56; Winnemucca and San Luis Obispo, 48; Carson City, 47; Bismarck, Sioux City, and North Platte, 46; Amarillo and Fort Smith, 45; Dodge City, 44. The smallest values were: Key West, Tatoosh Island, and Fort Canby, 14; Astoria, 16; Galveston and Seattle, 17; Nantucket, Hatteras, East Clallam, and Port Angeles, 18; Charleston and Port Eads, 19. Among the extreme monthly ranges the largest values were: Lander, 78; North Platte, 77; Bismarck, 75; Williston, Huron, and Pueblo, 74; Moorhead and Denver, 73. The smallest values were: Fort Canby, 21; Key West, 22; Tatoosh Island, 23; Astoria, 24; Olympia, 29; Port Eads and Port Angeles, 31.

The *accumulated monthly departures* from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
New England	+ 2.2	+ 0.2	Middle Atlantic	— 8.8	— 0.8
North Dakota	+ 0.2	0.0	South Atlantic	—16.5	— 1.5
Missouri Valley	+ 0.9	+ 0.1	Florida Peninsula	—13.5	— 1.2
Northern Plateau	+ 2.4	+ 0.2	East Gulf	—18.1	— 1.6
			West Gulf	—19.9	— 1.8
			Ohio Valley and Tenn.	—13.4	— 1.2
			Lower Lake	— 7.8	— 0.7
			Upper Lake	— 1.0	— 0.1
			Upper Mississippi	— 3.0	— 0.3
			Northern Slope	—12.0	— 1.1
			Middle Slope	— 6.0	— 0.5
			Abilene (southern Slope)	—21.6	— 2.0
			Southern Plateau	— 8.2	— 0.7
			Middle Plateau	—12.4	— 1.1
			North Pacific	— 3.7	— 0.3
			Middle Pacific	— 6.5	— 0.6
			South Pacific	— 8.7	— 0.8

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight contained in a cubic foot of air, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporometer may be made to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Sensible temperatures.—The sensation of temperature experienced by the human body and ordinarily attributed to the condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. The condition of the atmosphere as to moisture is so important that it has, by exaggeration, been sometimes considered as a controlling feature and the temperature of the wet-bulb thermometer, when whirled in the shade, has been called the sensible temperature, although this is often but a partial index of the sensation of temperature. In order to present a monthly summary of the atmospheric conditions on which hygienic and physiological phenomena depend, the moisture must be fully considered, and therefore Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time. A complete expression for the relation between atmospheric conditions and nervous sensations is under consideration, but has not yet been obtained.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The precipitation was heaviest, 8.00 to 12.00, over a small portion of the coasts of Oregon and Washington.

It slightly exceeded 6.00 over the greater part of those coasts, as also on portions of the coasts of Texas, North Carolina, and New England. A narrow ridge of 6.00 to 8.00 extended from central Arkansas to southern Indiana.

The *diurnal variation* is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 6 are weighing gauges.

The *normal precipitation* for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the end of 1891, with annual, seasonal, monthly, and other charts."

The *departures* from the normal precipitation are given in Table I, which shows that there was an excess in New England, the Lake Region, Ohio Valley, south Atlantic Coast, and the northern and southern Rocky Mountain slopes.

Large excesses were: Boston, 3.40; Portland, Me., and Chicago, 2.00; Louisville, 2.90; Indianapolis, 2.89; Northfield and Hatteras, 2.60. Large deficits were: New Orleans, 3.80; Mobile, 3.50; Pensacola, 3.10; Atlanta, 3.00; Key West and Tatoosh Island, 2.40.

The average departure for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100):

Above the normal: New England, 145; South Atlantic, 113; West Gulf, 112; lower Lake, 138; upper Lake, 116; North Dakota, 300; upper Mississippi, 109; Missouri, 112; northern Slope, 202; southern Plateau, 153.

Normal: Ohio Valley and Tennessee, 100; middle Slope, 100.

Below the normal: Middle Atlantic, 88; Florida Peninsula, 86; east Gulf, 30; Abilene, (southern Slope), 89; middle Plateau, 86; northern Plateau, 92; north Pacific, 86; middle Pacific, 85; south Pacific, 65.

The years of greatest and least precipitation for November are given in the REVIEW for November, 1894. The precipitation for the current month was the greatest on record at: Northfield, 5.68; Toledo, 5.03; Louisville, 7.01; Wichita, 1.80; Kansas City, 3.05; St. Vincent, 1.21; Williston, 1.91; Miles City, 0.77; Rapid City, 1.03; Lander, 2.30. It was the least on record at: Sault Ste. Marie, 1.51; Green Bay, 1.50; Port Eads, 0.64.

The *total accumulated monthly departures* from normal precipitation, from January 1 to the end of the current month, are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
Florida Peninsula	+ 0.10	100	New England	— 4.80	88
Abilene (southern Slope)	+ 5.80	122	Middle Atlantic	— 8.80	79
Southern Plateau	+ 0.80	108	South Atlantic	— 5.00	91
			East Gulf	— 7.90	85
			West Gulf	— 6.10	85
			Ohio Valley and Tenn.	—11.40	74
			Lower Lakes	— 7.40	77
			Upper Lakes	— 8.00	74
			North Dakota	— 0.80	96
			Upper Mississippi	— 8.80	74
			Missouri Valley	— 5.00	84
			Northern Slope	— 0.20	99
			Middle Slope	— 1.60	92
			Middle Plateau	— 1.80	88
			Northern Plateau	— 4.20	71
			North Pacific	— 8.70	83
			Middle Pacific	— 3.00	88
			South Pacific	— 3.20	77

Details as to excessive precipitation are given in Tables XIII and XIV. The total snowfall at each station is given in Table II. Its geographical distribution is given on Chart No. VI of total monthly snowfall. The isotherms of minimum 32° and 40° are also shown on this chart for comparison with the snow limit.

The depth of snow on the ground at the close of the month is shown on Chart VII.

HAIL.

The following are the dates on which hail fell at one or more stations in the respective States:

Arizona, 12. Arkansas, 25. California, 3. Colorado, 4. Connecticut, 2. Iowa, 6. Maryland, 10. Nebraska, 5. New Mexico, 4, 12. Oregon, 13, 20, 27 to 30. Rhode Island, 2. South Dakota, 5. Washington, 2, 28. West Virginia, 12, 28, 29.

SLEET.

The following are the dates on which sleet fell at one or more stations in the respective States:

Arizona, 2, 3, 4, 12, 23, 24, 25. Arkansas, 12, 24, 25. California, 3, 4, 5. Colorado, 4, 12, 21, 22. Connecticut, 2, 3, 24. Delaware, 2, 10. District of Columbia, 2, 10. Idaho, 2, 11, 13, 21, 27, 29. Illinois, 13, 19, 22 to 25. Indiana, 9, 16, 23 to 26. Indian Territory, 23, 24, 25. Iowa, 6, 7, 13, 16, 18, 19, 20, 22, 23, 24, 26, 28, 29, 30. Kansas, 12, 21 to 26, 30. Maine, 2, 21, 23, 25. Maryland, 2, 10, 26. Massachusetts, 2, 3, 10, 15, 22 to 25. Michigan, 8, 9, 15, 16, 19, 22 to 27, 29. Minnesota, 7, 13, 28, 29, 30. Mississippi, 12, 13. Missouri, 8, 9, 12, 14, 19, 20, 22 to 28, 30. Montana, 21. Nebraska, 6, 7, 13, 21, 24, 30. Nevada, 3, 4, 12, 26, 27, 29. New Hampshire, 2, 10, 14, 25, 26. New Jersey, 2, 10. New Mexico, 6, 12, 22. New York, 2, 20 to 27, 30. North Dakota, 5, 12, 13, 15, 20, 28, 29, 30. Ohio, 17 to 20, 23 to 26. Oklahoma, 6, 22, 23, 24. Oregon, 13, 14, 21. Pennsylvania, 2, 10, 22, 25, 26, 28, 29, 30. South Dakota, 7, 18, 21, 27, 28, 29. Tennessee, 10, 26. Texas, 23, 24, 25. Utah, 4, 12. Vermont, 21, 26. Virginia, 2, 10, 12, 17, 19. Washington, 10, 20, 21, 26, 27. West Virginia, 10, 20, 26. Wisconsin, 7, 8, 13, 15, 16, 19, 25, 29, 30.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 16 regular stations of the Weather Bureau by its photographic, and at 22 by its thermal effects. At one station records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric sheets show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of clear sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary

when the duration of cloudiness is alone desired, as is usually the case.

The cloudiness is determined by numerous personal observations at all stations during the daytime, and is given in the column of "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table XI.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *duration* of direct sunshine whence the percentage of duration of possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. These numbers have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observers' personal estimate of percentages of area of clear sky; the average excess for November, 1895, is 4 per cent for photographic records, and 6 per cent for thermometric records. The details are shown in the following table:

Difference between instrumental and personal observations of sunshine.

Photographic stations.	Instrumental.	Personal.	Difference.	Thermometric stations.	Instrumental.	Personal.	Difference.
Phœnix, Ariz.	81	70	11	San Francisco, Cal	66	63	3
San Diego, Cal.	78	70	8	Atlanta, Ga.	64	58	6
Santa Fe, N. Mex.	70	65	5	Vicksburg, Miss.	59	55	4
Dodge City, Kans.	69	64	5	New Orleans, La.	57	56	1
Denver, Colo.	68	53	15	Little Rock, Ark.	54	43	11
Eureka, Cal.	63	58	5	Philadelphia, Pa.	52	43	9
Savannah, Ga.	52	50	2	Detroit, Mich.	51	40	11
Salt Lake City, Utah	50	34	16	St. Louis, Mo.	51	35	16
Galveston, Tex.	48	46	2	Wilmington, N. C.	50	48	2
Washington, D. C.	46	52	— 6	New York, N. Y.	49	44	5
Kansas City, Mo.	45	44	1	Portland, Me	48	38	10
Helena, Mont.	38	34	4	Baltimore, Md.	45	49	— 4
Eastport, Me	37	30	7	Columbus, Ohio	45	31	14
Portland, Oreg. †	31	34	— 3	Des Moines, Iowa	45	32	13
Cleveland, Ohio	28	32	— 4	Rochester, N. Y.	45	36	9
Bismarck, N. Dak.	19	31	—12	Chicago, Ill.	41	31	10
				Cincinnati, Ohio	41	37	4
				Boston, Mass.	37	34	3
				Louisville, Ky.	34	29	5
				Buffalo, N. Y.	32	26	6
				Portland, Oreg. †	29	34	— 5
				Marquette, Mich.	.....	.....	.....

* No thermometric report. † Records kept by both methods.

WIND.

The *prevailing winds* for November, 1895, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart II, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

The *diurnal variation* in the velocity of the wind is shown in Table VI, which gives the total movement for each hour of seventy-fifth meridian time, as deduced from self-registering anemometers at about 136 stations.

HIGH WINDS.

Maximum wind velocities of 50 miles or more per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Block Island, R. I.	2	54	ne.	Hatteras, N. C.	13	52	n.
Do.	13	50	ne.	Independence, Cal	21	50	n.
Buffalo, N. Y.	26	68	w.	Kittyhawk, N. C.	2	54	n.
Chicago, Ill.	27	53	s.	Do.	12	59	n.
Cleveland, Ohio.	26	73	s.	Do.	13	54	n.
Detroit, Mich.	26	76	sw.	Lexington, Ky.	26	62	s.
El Paso, Tex.	3	50	sw.	Louisville, Ky.	25	50	sw.
Erie, Pa.	26	54	sw.	Do.	26	57	sw.
Fort Canby, Wash.	13	72	se.	Port Huron, Mich.	26	58	sw.
Do.	25	62	se.	Toledo, Ohio.	26	60	sw.
Do.	28	78	se.	Woods Holl, Mass.	1	50	se.
Do.	29	60	s.	Do.	21	52	sw.
Hatteras, N. C.	12	54	n.				

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table X, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

The dates on which reports of thunderstorms for the whole area were most numerous, were: 5th, 29; 25th, 22; 26th, 29.

Thunderstorm reports were most numerous in: Florida, 17; Massachusetts, 15; New Jersey, 24.

Thunderstorms were most frequent in: Florida, 8; Arizona and Texas, 6; Arkansas, Georgia and Oregon, 5.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from the 1st to the 5th, inclusive, and also the 27th to 30th. On the remaining twenty-one days of this month 333 reports were received, or an average of about 16 per day. The dates on which the number of reports especially exceeded this average were: 9th, 142; 10th, 63; 11th, 39; 12th, 21; 23d, 28.

The ratio of the number of reports to the number of observers was largest in: Illinois, 29 per cent; Minnesota, 75; North Dakota, 80; South Dakota, 43; Wisconsin, 67.

Auroras were reported most frequently in: Minnesota, Montana and Wisconsin on nine days; Massachusetts and New York, eight; Illinois, North and South Dakota, seven.

The most important display of the month was that of the 9th, 10th, 11th, and 12th. Many observers remark on this as being one of the brightest auroras on their records.

CANADIAN DATA—THUNDERSTORMS AND AURORAS.

The only thunderstorm reported was on the 9th at Montreal.

The dates of auroras were as follows: Sydney, 11; Grand Manan, 12; Father Point, 13, 24; Quebec, 24; White River, 9; Saugeen, 12; Port Arthur, 9 to 12; Winnipeg, 9; Minnedosa, 10 to 15, 21, 23, 24; Qu'Appelle, 9; Medicine Hat, 11, 22; Swift Current, 23; Prince Albert, 22, 23, 25, 26; Edmonton, 11.

INLAND NAVIGATION.

The *extreme and average stages of water* in the rivers during the current month are given in Table VII, from which it will be seen that no river attained the danger point and that on the average the waters continued quite low, as in October. At Vicksburg the Mississippi declined steadily until the 14th, when it was 6.3 feet below the low water mark adopted as the zero of the gauge. At Memphis, Helena, Arkansas City, Greenville, and Vicksburg the mean stage of water for the month was from 2.0 to 5.7 feet below the zeros of the respective gauges. During the latter part of the month the Ohio River and its tributaries generally rose a few feet.

ICE IN RIVERS AND HARBORS.

The following reports of ice in connection with navigation have been received:

Williston, N. Dak.—8th, the Missouri River frozen over at this place and at Fort Buford.

St. Vincent, Minn.—6th, the Red River of the North frozen over and foot passengers crossing on the ice.

St. Paul, Minn.—26th, the Mississippi River frozen and navigation closed.

Sioux City, Iowa.—21st, a small amount of running ice in Missouri River; 22d, much running ice in river; 23d, river channel full of running ice.

Omaha, Nebr.—25th, large quantities of floating ice running in the Missouri.

Davenport, Iowa.—24th, small quantities of floating ice in the Mississippi near shore; 26th, river full of floating ice.

METEOROLOGY AND MAGNETISM.

By Prof FRANK H. BIGELOW.

For general remarks relative to this subject see page 7 of the REVIEW for January, 1895, and page 371 of the REVIEW for October, 1895.

The comparison of the air temperature with magnetic horizontal force is shown in detail on Chart V, and the special features of the November curves are as follows:

A comparison of the curves of vertical force for Washington and Toronto shows that, in order to minimize the deflections caused by the passing trolleys, the magnetic balance at Washington is damped very much more than that at Toronto. In order to bring these deflections approximately to the same amplitude the following method has been adopted: Each station is computed separately to obtain the values of dz or the deflections in the vertical force; then the values for Washington are multiplied by the factor 2, and those for Toronto by the factor $\frac{1}{4}$; finally, the means are taken, which appear as dz in the table of Chart V.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts in regard to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective services.

Snowfall and rainfall are expressed in inches.

Alabama.—The month was dry, with marked thermal changes, and unusually cool. The mean temperature was slightly above the normal. The highest temperature, 84°, was recorded at Ashville on the 7th, and the lowest, 18°, at Decatur and Newburg on the 27th. The average precipitation was 1.64, or 2.20 less than normal; the greatest amount, 3.60, occurred at Cordova, and the least, 0.46, at Livingston. Owing to the prolonged deficiency in moisture nearly all rivers were so low that navigation was nearly suspended. Thick ice formed in various sections on the 27th. Frosts were reported on all dates, except 6th to 9th, 15th, 19th, 23d to 25th, and 29th.

Arizona.—The mean temperature was 51.8°, or about 3° below the normal. The highest temperature, 91°, occurred at Mohave on the 1st, and Parker on the 19th, and the lowest, 8° below zero, at Holbrook on the 26th. Rains were general throughout the Territory from the 2d to 4th, 11th, 12th, and from 22d to 24th, inclusive. The average total amount, 2.70, was 1.85 in excess of the normal. The greatest monthly rainfall was 6.83 at Oracle, and the least, 0.01, at Texas Hill. Frosts occurred on the 1st to 14th, and from the 23d to 28th; hail on the 11th and 14th, and snow on the 2d, 3d, 4th, 12th, 22d, 23d, 24th, and 25th; the largest amount was 0.36 at Show Low.

Arkansas.—The mean temperature was 49.9°, or 0.08° below the normal. The highest temperature, 82°, was recorded at Bee Branch on the 18th, and lowest, 16°, at Winslow on the 25th, and Keesees Ferry on the 27th. The average precipitation, 4.87, was 0.23 less than the usual amount. The greatest monthly amount, 7.68, occurred at Osceola, and the least, 2.75, at Fulton. There was sufficient moisture for all agricultural needs, but the rivers were low during the greater part of the month, making navigation of the Arkansas extremely difficult.

California.—The mean temperature was 52.8°, or 0.6° below the normal. The highest temperature, 98°, was recorded at Salton on the 19th, and the lowest, 1° below zero, at Bodie on the 30th. The average precipitation was 1.43, or 1.00 less than normal. The greatest monthly amount, 5.34, occurred at Fort Ross, and the least, 0.00, at Pasadena, Ravenna, and Volcano Springs. Snow to the depth of from "trace" to 28 inches was reported from some of the mountain stations. Frosts occurred at one or more stations every day.

Colorado.—The mean temperature was about normal over Mesa and Montrose counties, but in other sections the month was cooler than usual; the deficiency averaged about 2° per day over the eastern Slope, 4° in the San Luis Valley, and 5° over the northwestern counties. The highest temperature was 80° at Crook on the 2d, and at Minneapolis on the 2d and 21st, and the lowest, 35° below zero, at San Juan (near) on the 25th. In the central mountain districts only half of the usual amount of precipitation occurred, while over the western valleys from 2 to 5 times the average amount was recorded. East of the mountains there were no marked departures from the normal. The greatest amount was 10.73 at Ruby, and the least, 0.06, at Julesburg. The depth of snow on the ground at the end of the month (as well as the area covered on the western side) was much greater than at the same date last year, Ruby having a depth of 5 feet.

Connecticut.—(See *New England.*)

Delaware.—(See *Maryland.*)

Florida.—The mean temperature was 66°, or about normal. The highest temperature was 90° at Orlando on the 10th, and the lowest, 30°, at Tallahassee, on the 27th. The average amount of precipitation, 2.71, was about 0.23 in excess of the normal. The greatest monthly amount, 5.53, occurred at St. Augustine, and the least, 0.24, at Key West. Frosts occurred on the 13th, 14th, 16th, 18th, 20th, 21st, 22d, and 27th.

Georgia.—The mean temperature was 54.6°, or about 1° above the normal. The highest temperature was 89° at Brunswick on the 9th, and the lowest, 19°, at Clayton on the 21st. The average precipitation was 1.75, or 1.35 less than the usual amount. The greatest monthly was 3.74 at Savannah, and the least, 0.73, at Fort Gaines. Although November is one of the driest months, it was this year even drier than usual. Frosts were general in the northern and central counties, and in exposed localities in the most northerly protions of the southern counties during the period from the 11th to 13th, when the first killing frosts of the season were recorded at many places.

Idaho.—The mean temperature was 33.1°, or about 7° below that for November of last year. The highest temperature was 72° at St. Anthony on the 28th, and the lowest, 17° below zero, at Warren on the 22d. The average amount of precipitation was 1.08; the greatest amount for the month, 2.91, at Murray, and the least, 0.15, at Payette.

Illinois.—The mean temperature was 39.2°, or but a fraction of a degree above the normal. The highest temperature was 79° at Carlinville on the 7th, but elsewhere the highest generally occurred on the 4th; the lowest temperature, 6° below zero, occurred at Winnebago on the 21st. The average precipitation was 3.85, or about 0.75 in excess of the usual amount. The greatest amount, 7.37, was recorded at Iron, and the least, 1.62, at Scales Mound. Snowfall was practically confined to the central and northern counties; that in the northeast counties being very heavy. The average depth for the State was above 6 inches.

Indiana.—The mean temperature was 41.1°, or but 0.4 above the normal. The highest temperature was 78° at Madison on the 6th, and the lowest, 6°, at Valparaiso on the 26th. Excessive rains fell everywhere on many days. The average precipitation was 5.51, or 1.71 in excess of the usual amount. The greatest monthly amount was 12.98, at Marengo, and the least, 2.55, at Valparaiso. Snow on the 9th, 16th, 20th, 21st, 24th, 25th, 26th, and 30th. The greatest amount of snow fell in the northern counties, where a depth of 15 inches was recorded. Stock-water in wells, springs, and streams was increased and navigation on the Ohio River resumed. Lightning occurred on the 7th.

Indian Territory. (See *Oklahoma.*)

Iowa.—The mean temperature, 34.3°, was about normal. The highest temperature, 86°, was recorded at Glenwood on the 4th, and the lowest, 12° below zero, at Williams on the 26th. The average precipitation was 1.51, or 0.25 less than normal. The greatest amount was 3.01 at Mooar, and the least, 0.45, at What Cheer. The month was generally favorable for farm work.

Kansas.—The mean temperature was 40.9°, or but 0.2° above the normal. The highest temperature, 82°, was recorded at Frankfort on the 4th, and the lowest, 2° below zero, at Coolidge, Ionia, and Jaqua on the 26th. The average precipitation was 1.43, or 0.48 in excess of the normal. The greatest amount, 4.19, occurred at Columbus, and the least, 0.20, at Grainfield. The average snowfall for the State was 1.5, the largest amount, 10.0, occurring at Oberlin, and the least, "trace," at several stations. Frosts occurred on every day except the 3d, 5th, 6th, 13th, and 28th.

Kentucky.—The month was slightly cooler than usual. The mean tem-

perature was 45.8°, or about 2° less than normal. The highest temperature, 85°, was recorded at Springfield on the 6th, and the lowest, 16°, at Bowling Green on the 27th. The heavy rains of the 8th, 9th, 23d, 24th, and 25th, broke the severe drought and replenished springs and streams that had been practically dry for months. The average precipitation was 4.29, or 0.34 in excess of the usual amount. The greatest amount for the month was 9.04 at Henderson, and the least, 0.90, at Sandy Hook. The precipitation averaged 5.20 for the Ohio Valley district 3.71 for the southern district, and 1.56 for the mountain district. Severe gales occurred at several stations on the 25th.

Louisiana.—The mean temperature was 51.4°, or but 0.4° below the normal. The highest temperature was 88° at Opelousas on the 20th, and the lowest, 21°, at Oxford and Davis on the 27th. The average precipitation was 3.55, or only 0.20 less than normal. The greatest monthly precipitation, 12.57, occurred at Lake Charles, and the least, 0.60, at Houma. Ice formed at one or more stations on the 2d, 11th, 12th, 13th, 17th, 19th, 20th, 21st, 26th, and 27th. Frost was reported on all days except the 5th to the 9th, 14th and 22d to 25th inclusive.

Maine.—(See *New England.*)

Maryland.—The mean temperature was 45.9°, or 1.9° above the normal. The highest temperature was 81° at Hancock on the 9th, and the lowest, 0°, at Deer Park on the 14th. The average precipitation, 1.41, was 2.21 less than normal. The greatest amount for the month was 3.51, at Mardela Springs, and the least, 0.34, at Cumberland. The largest snowfall was 3.0 at Oakland.

Massachusetts.—(See *New England.*)

Michigan.—The mean temperature was 34.6°, or 1.3° below the normal. The deficiency in temperature was very evenly distributed. The highest temperature was 76°, at Berlin on the 6th, and the lowest, 6° below zero, at Alma, Cheboygan, and Grayling on the 21st. The monthly range of temperature is the greatest for November of which there is record. The average precipitation was 3.28. or 0.26 above normal. It was below the normal over the Upper Peninsula and the northern counties of the Lower Peninsula, while over the central and southern counties it was above, the excess being greatest over the extreme southern portion. The greatest monthly amount of precipitation was 6.02 at Adrian, and the least, 0.20, at Hesperia. The average total snowfall was 11.6; that for the northern counties, 17.7, being the greatest.

Minnesota.—The mean temperature was 27.8°, or only 0.4° above the normal. The highest temperature was 72° at Wabasha on the 5th, and the lowest, 19° below zero, at Albert Lea on the 26th. The average precipitation, 1.22, was 0.38 above normal. The greatest monthly amount was 2.39 at Wabasha, and the least, 0.20, at Belle Plain.

Mississippi.—The mean temperature was 53.5°, or practically normal, as it was but 0.2° above. The highest temperature, 89°, was recorded at Vaiden on the 5th, and the lowest, 17°, at French Camp on the 27th. The average total precipitation was 2.54, or 2.10 less than the usual amount. The greatest amount for the month was 5.16 at Austin, and the least, 0.45, at Biloxi. A flurry of snow occurred at Pontotoc on the 30th, and "traces" of sleet at Itta Bena on the 12th and Pontotoc on the 13th. Frosts occurred on the 1st to 4th, 9th to 13th, 16th to 18th, 20th, 21st, and 26th to 28th and 30th. Killing frost reached the coast line at Biloxi on the 27th.

Missouri.—The mean temperature was 49.4°, or only 0.1° above the normal. The highest temperature, 82°, was recorded at Willow Springs on the 18th, and the lowest, 2°, at Elmira and Sublet on the 26th. The average precipitation was 3.40, or 0.96 above normal. In the southern sections there was an excess of 1.20; in the central section, 1.25; and in the northeast section, 0.95. Over the northern portion of the northwest section there was a deficiency. The greatest monthly amount was 7.06 at New Madrid, and the least, 0.52, at Maryville. The average snowfall was 3.2. Over the northeast, central and southwest sections, and the northern portion of the southeast and southern portion of the northwest sections the snowfall (the greater part of which fell during the storm of the 25th and 26th) was unusually heavy, many stations reporting from 4 to 6 inches.

Montana.—The mean temperature was 31°, or about 3° above the normal. The highest temperature was 77° at Toston on the 4th, and the lowest, 19° below zero, at Glasgow on the 6th; the coldest portion of the month was on the 22d and 23d. A warm wave prevailed during the middle of the month, accompanied by high winds, commonly known as chinooks. The average precipitation was 0.92, or about 0.28 above normal. The greatest amount for the month was 3.00 at Red Lodge, and the least, "trace," at Radersburg.

Nebraska.—The mean temperature was 34.8°, or 0.1° below normal. The highest temperature was 82° at Hickman on the 5th, and the lowest, 13° below zero, at Lynch and Springview on the 26th. The average precipitation was 0.94, or 0.26 above normal; in the southeastern section, 1.07; in the western section, 0.61. The greatest monthly amount was 2.95 at Creighton, and the least, 0.40, at several stations. Snow formed about half of the precipitation, and averaged 4.8 in depth for the month. Over the northern half of the State much snow remained on the ground at the close of the month. Hail was reported from Spencer on the 5th; sleet on the 6th, 7th, 13th, 21st, 24th, and 30th.

Nevada.—The mean temperature was 35.9°, or 2.1° below the normal. The deficiency was general, except at Carson City, where there was an excess of about 2°. The highest temperature was 80° at St. Thomas on the 1st and Silver Peak on the 19th, and the lowest, 10° below zero, at Halleck on the 5th. A sudden fall of about 30° in temperature, to or below freezing, occurred on the 22d, accompanied by high winds. In some instances, notably at Hamilton and San Antonio, the maximum temperature of the 22d was 43° lower than that for the day previous. The average precipitation was 0.67, or 0.05 below the normal. The greatest monthly fall was 1.90 at Cortez, and the least, 0.00, at Hot Springs and Lovelock. The amount of snowfall, 5.2, was seasonable and well distributed throughout the month.

New England.—The mean temperature was 41.3°, or 2.5° above the normal of 22 stations having records for more than ten years. The maximum was 78° at Lake Cochituate on the 8th, and the minimum, 3° below zero, at West Milan on the 22d. The average precipitation was 6.03, or 2.04 above the normal of 31 stations having records of more than ten years. The greatest monthly amount was 10.44 at Roxbury, and the least, 3.39, at Simonsville. The rainfall was generally heaviest in the east-central districts, but considerable fell over all New England, so that most reservoirs are full.

New Mexico.—The temperature averaged a little above normal; the highest was 80°, at Roswell on the 21st, and the lowest, 5° below zero, at Chama on the 25th. The precipitation was above the normal and was very well distributed. The greatest amount was 3.60, at Fort Wingate, and the least, 0.27, at Raton. A total of 34 inches of snow fell at Chama.

New York.—The mean temperature was 39.0°, or 1.9° above the normal. The highest temperature was 76°, at Bedford on the 7th, and the lowest was 2° below zero at Canton on the 22d. The average precipitation was 4.14, or 0.71 above the normal. The greatest general precipitation (exceeding 6.00) fell over the western portion of the Adirondack plateau; the least (under 3.00) fell at several stations in the central part of the State. The average snowfall for the State was 2.8, and the greatest amount, 12.9, at Malone.

North Carolina.—The mean temperature was 50.8°, or 1.1° above the normal. The highest temperature was 84°, at Newbern on the 10th, and the lowest 15°, at Highlands on the 27th, and at Linnville on the 28th. The average precipitation was 3.15, or 0.25 below the normal. The greatest monthly amount was 7.78, at Hatteras, and the least, 1.24, at Morganton. Ice formed on many days and there were killing frosts everywhere, except along the extreme east coast over the "Banks."

North Dakota.—The mean temperature was 20.6°, or 1.5° below the normal. The highest temperature was 76°, at New England City on the 3d, and the lowest, 25° below zero, at Steele on the 30th. The average precipitation was 1.08, or 0.46 above the normal. The greatest monthly amount was 1.91, at Williston, and the least, 0.09, at Woodbridge.

Ohio.—The mean temperature was 4.19°, or 0.9° above the normal. The highest temperature was 85°, at Hillsboro on the 6th and 7th, and the lowest, 5°, at Norwalk on the 21st. The average precipitation was 4.11, or 1.03 above the normal. The greatest monthly total was 6.35, at Oberlin, and the least, 0.87, at Thurman. The greatest amount of snow fell between the 19th and 24th, and in many of the more northern counties the average on those dates was nearly 2.00. There is, in general, an abundance of water for all purposes.

Oklahoma.—The mean temperature was 46.6°, or 2.7° below the normal. The highest temperature was 86° at Ponca on the 11th, and the lowest, 6°, at Anadarko on the 25th. The average precipitation was 3.79, or 1.93 above the normal. Greatest monthly rainfall was 5.80 at Tulso, and the least, 1.13, at Woodward. The first destructive frost occurred on the morning of the 1st. The snow of the 25th averaged 2.5 throughout the Territory, which is the heaviest snowfall ever recorded in November.

Oregon.—The mean temperature was 41.3°, or 41° below the normal. The highest temperature, 79°, was recorded at Langlois on the 16th, and the lowest, 3° below zero, at Lone Rock on the 22d. This is the first time that the temperature in Oregon has fallen below zero during November. The average precipitation was 4.03, or 1.31 below the normal. The greatest monthly total precipitation was 13.25, at Glenora, and the least, 0.30, at Canyon City and Happy Valley. The snowfall for the month was not very heavy.

Pennsylvania.—The mean temperature was 42.9°, or 2.9° above the normal. .The highest temperature, 78°, occurred at Somerset on the 8th, and at Lancaster on the 9th, and the lowest, 6°, at Smithport on the 22d. The average precipitation was 2.48, or 0.74 below normal. The largest monthly total rainfall was 5.73 at Warren, and the least, 0.97, at Hollidaysburg. The snowfall for the month was light.

South Carolina.—The mean temperature was 54.4°, or 0.7° below the normal. The highest temperature was 88°, at Kingstree on the 9th, and the lowest, 21°, at Cheraw on the 21st. The average precipitation was 2.35, or 0.26 below the normal. The greatest was 4.46, at Pinopolis, and the least, 0.40, at Shaw's Forks. The first general killing frost occurred on the 21st.

South Dakota.—The mean temperature was 29.3°, or 4.4° below the normal. The highest temperature was 79° at Cherry Creek on the 1st, and the lowest, 20° below zero, at Watertown on the 22d. The average precipitation, was 1.21, or 0.69 above the normal. The greatest monthly total was 4.89 at Webster, and the least was 0.02 at Cherry Creek.

Tennessee.—The mean temperature was 49.1°, or about 2° above the normal. The highest temperature was 86° at Elizabethton on the 7th, and the lowest, 17°, at Franklin and Hohenwald on the 27th. The average precipitation was 2.97, or 0.75 below the normal. The greatest rainfall was 7.68 at Osceola, and the least, 0.78, at Harriman. Killing frosts were reported at various times during the month.

Texas.—The temperature on an average for the State was 2.1° below the normal. The highest temperature was 87° at Alice on the 8th, and the lowest, 10°, at Dean on the 25th and at Graham on the 26th. The precipitation averaged 0.79 above the normal. The rainfall was not well distributed; there was a deficiency over the northern and eastern portions of the State, and an excess over the central and southern portions. The greatest monthly rainfall was 9.35 at Angleton, and the least, 0.65 at Dean. There was a general snowstorm over the northern portion of the State on the 25th.

Utah.—The mean temperature was 32.7°. The highest recorded was 75° at Fillmore on the 2d, and the lowest, 24° below zero, at Koosharem on the 3d. The average precipitation was 1.47, or about normal. The greatest monthly amount was 2.44, at Salt Lake City, and the least, 0.40, at Loa. The average snowfall for the month was 11.0.

Virginia.—The mean temperature for the State was 48.0°. The highest temperature recorded was 82°, at Bon Air on the 9th, and the lowest, 12°, at Buckingham on the 28th. The average precipitation was 2.38. The greatest monthly total was 6.45, at Rocky Mount, and the least, 0.69, at Alexandria.

Wisconsin.—The mean temperature was 3.13°, or 1.10° above the normal. The highest temperature reported was 74°, at Pine River on the 4th, and the lowest, 8° below zero, at Osceola Mills on the 26th. The average precipitation was 1.66, or 0.80 below the normal. The greatest amount was 3.68 at Sharon, and the least, 0.28, at Butternut. The ground was covered with snow from the 19th to the end of the month.

Wyoming.—The mean temperature was 30.0°, or several degrees below the normal. The highest temperature was 70° at Fort Washakie on the 17th, and the lowest, 18° below zero, at Sheridan on the 23d. The average precipitation was 1.30, or about twice the normal value. The greatest amount was 2.72, at Sundance, and the least, 0.32, at Laramie. All the precipitation during the month was snow.

Washington.—The mean temperature was 41.1°, or 2° below the normal. The highest temperature, 70°, was recorded at Connell on the 10th, and the lowest, 8°, at Ellensburg on the 5th, Hunters and Moxee on the 23d. The average precipitation was 3.76, or 1.49 below the normal. The greatest amount during the month was 11.55, at Neah Bay, and the least, 0.00, at Connell.

West Virginia.—The mean temperature was 44.6°, or about 2° above the normal. The highest temperature was 87°, at Nuttallburg on the 7th, and the lowest, 12°, at Beverly on the 13th. The average precipitation was 2.17, or below the average, but, on the whole, was well distributed. The greatest monthly total was 4.00, at Spencer, and the least, 1.34, at Bloomery.

STUDIES BY FORECAST OFFICIALS.

WEATHER TYPES OF THE NORTH PACIFIC SLOPE.

By B. S. PAGUE, Local Forecast Official (dated Portland, Oreg., Dec. 20, 1895).

There are two distinct, well-defined types of weather on the North Pacific Slope, viz, the summer type and the winter type. These are illustrated by the following sketch of the meteorology of 1895:

On April 20 the first type of summer weather conditions appeared over the North Pacific Slope, viz, an area of high barometric pressure moving northward along the coast to northwestern Washington, and thence eastward over the State of Washington. In the synopsis of April 20 it was officially announced at Portland that the conditions which would prevail until the first appearance of a winter type of weather would be more in favor of fair weather than of rain, for it had been observed that after the first appearance of a pure type of summer conditions there is seldom a recurrence of the winter type until the autumn.

The spring, summer, and autumn were unusually dry. This was especially true of the period from September 15 to November 1, which was the driest recorded in the history of this portion of the country during the past fifty years. Experience had shown that no general or continued rain would occur until the first appearance of the winter type of storms, and this knowledge was used in the daily forecasts issuing regularly from the Weather Bureau office at Portland, Oreg. This winter type finally appeared on the morning of Tuesday, November 12.

On Monday morning, November 11, 1895, there was no appearance of any storm disturbance, but by noon of that day the rapid fall in the barometer indicated the approach of a well-defined disturbance, and from the evening reports of this date the approaching storm was forecast. The morning reports of November 12 showed that the storm area was central over northwestern Washington and that the trough of the depression extended northeastward over British Columbia, thereby indicating the probable path of the storm. Warnings of approaching rains and high winds had been issued on the evening of November 11, or from twelve to twenty hours before the storm arrived. The morning reports of November 12 showed that an area of high barometer was approaching from the southwest toward California. General precipitation occurred over Washington, Oregon, and Idaho on the 12th and 13th, and heavy gales from the south and east prevailed along the coast of northern Oregon and Washington. The morning reports of November 13 showed that the low was now central north of eastern Montana and that the high pressure was moving inland over southern Oregon and northern California. The morning reports of November 14 showed the low area in about the same position, but more distinctly defined, and the high area central near the region where Oregon, Idaho, Nevada, and Utah come nearest together. The morning reports of the 15th showed the high over Oregon and northern Nevada and the low slightly east of its position of the previous day.

The feature to which attention is especially called is the passage of the low eastward over Washington and the formation of the area of high pressure. This movement of the low and formation of the high were the first of the kind to occur in the autumn of 1895, and indicated that the wet or winter season had set in over the north Pacific Slope.

The conditions under which areas of high pressure form and move are those under which chinook winds are formed over the northwestern portion of the United States. As the low pressure passes to the north and the movement of the wind is from the high on the south or southwest to the low on the northeast side of the mountains, therefore the air flowing down the mountain sides is dynamically heated.

That the high pressure produced the rise in the temperature and the winds called chinook winds in the present case is shown by the following:

On the morning of November 12 the barometer at Portland was 29.86, the temperature 36°; on the morning of the 15th the barometer was 30.62 and the temperature 56°, a rise in the pressure of 0.76 of an inch and a rise of 20° in the temperature. At Roseburg the rise in the barometer was 0.72 of an inch and the temperature rose 16°; at Seattle the barometer rose 0.72 of an inch and the temperature 16°; at Baker City the barometer rose 0.66 of an inch and the temperature 12°; at Spokane the barometer rose 0.42 of an inch and the temperature rose 26°: at Helena the barometer rose 0.20 of an inch and the temperature 30°. Chinook winds occurred in Montana on November 16 and 17.

The following, from the November report of the Montana State Weather Service, may, in this connection, be of interest:

> A cold-wave signal having been ordered for that date (November 17), and the weather at the time of receipt of order being very warm and pleasant, the observer [Mr. R. M. Crawford, at Helena] decided to pay more than ordinary attention to the expected change. About 3.30 p. m. the wind, which had been blowing gently from the north, veering at

times to the northeast, with a velocity of about 9 miles an hour, stiffened quickly and came directly from the north, lowering the temperature 6° in less than five minutes.

The indications were that the temperature would fall much lower, but suddenly dark, vaporous-looking clouds appeared in the extreme southwest; with them simultaneously a strong gale from the same quarter, blowing at the rate of at least 40 miles an hour. The gale seemed to meet the wind coming in from the north, and drove it in a whirl directly toward the northeast, across the prairie, in a funnel-shaped cone, plainly perceptible for a long distance by the dust gathered. The temperature quickly rose to 58°, the maximum recorded for this date, and the chinook had mastered the cold wave.

Under some circumstances a rise of from 0.25 to 0.75 inch in pressure will produce colder weather, but under other conditions, such as those that prevailed on this occasion, a rise in pressure will produce a rise in temperature, or chinook winds, over the northwest portions of the United States. The rise in temperature in the latter case, accompanying a rise in pressure, can only be ascribed to dynamic heating.

The following table, showing pressure and temperature at 8 a. m., seventy-fifth meridian time, from November 8 to 18, inclusive, at the regular Weather Bureau stations, in the region now under consideration, illustrates the conditions prevailing during this first chinook in the autumn of 1895:

Nov. 1895.	Portland.		Roseburg.		Seattle.		Baker City.		Spokane.		Helena.	
	Bar.	Temp.	Bar.	Temp.	Bar.	Temp.	Bar.	Temp.	Bar.	Temp.	Bar.	Temp.
8	30.36	34	30.34	26	30.36	46	30.32	30	30.42	32	30.30	34
9	30.16	34	30.18	32	30.10	42	30.26	26	30.26	32	30.30	28
10	30.12	48	31.14	46	30.02	48	30.04	34	30.04	36	30.22	26
11	30.36	36	30.30	36	30.32	40	30.22	32	30.32	30	30.28	28
12	29.86	36	29.90	38	29.98	40	29.96	20	30.02	24	30.10	24
13	30.34	44	30.40	36	30.36	40	30.34	30	30.30	32	30.12	34
14	30.40	50	30.48	46	30.28	54	30.38	32	30.32	42	30.32	42
15	30.02	56	30.02	52	30.50	56	30.02	32	30.44	50	30.30	54
16	30.58	46	30.52	48	30.56	48	30.60	28	30.50	42	30.32	50
17	30.32	44	30.30	42	30.26	48	30.38	32	30.18	40	30.08	44
18	30.36	44	30.30	42	30.36	50	30.32	30	30.26	38	30.00	50

[NOTE.—A general explanation of the relation of chinooks to areas of high pressure was given in the MONTHLY WEATHER REVIEW for 1894, on page 77, and a further illustration on page 444. In a recent letter (February 3, 1896) Mr. Pague says:]

It is not, as I understand, admitted by all that chinook winds occur west of the Cascades. From my knowledge of conditions over the Pacific northwest I maintain that perfect forms of chinooks occur west of the Cascades and Rocky Mountains as well as to the east of the Rocky Mountains. The degree of moisture in the chinook winds varies with the conditions and the country over which they blow (at Walla Walla, Wash., for example, sometimes the very dry chinook occurs, which causes the snow to disappear without leaving any water behind); again, under another chinook the snow is melted and little evaporation takes place. The explanation of this is as follows: In the first case, there is little or no movement of the upper currents from off the ocean, hence the expansion and heating of the air will allow dry air to be brought into contact with the snow which evaporates as it melts. In the second case, there is a decided movement of air from the ocean inland and the dryness of the chinook is overcome by the vastness of the supply of moist air. The Rocky Mountains bar the moist air and, therefore, to the east of the Rockies the dry chinook usually prevails.

From November to March the mean temperature over Washington and Oregon is materially higher than it is to the east of the Rocky Mountains over the country having the same latitude. This mild winter temperature is generally ascribed to the proximity of the ocean and to the Japan current (Kuro-Sivo). While the ocean does modify the otherwise low temperature, yet the mean temperature is as much or more influenced by the dynamic heating of the air or chinook winds. If, during the winter season, the low is off the California coast the cold air on the northeast flows southeastward and gives the low temperatures over Washington and Oregon; if the low is passing eastward over British Columbia and a high is central about Salt Lake City, then the dynamic heating, or chinook winds, prevail and high temperature occurs.

In these two instances the oceanic influence is only indirect. Comparatively high temperatures also occur in connection with lows moving from off the California coast northward along the Oregon and Washington coasts, gradually extending inland; in this latter case the oceanic influence on the mean temperature is of direct effect.

Low mean temperatures occur from November to March when the lows are frequent and move southward along the coast to the Columbia River or farther south (they seldom move much to the south of the Columbia). Mean temperatures above the normal occur when the lows pass eastward at a high latitude, about British Columbia. In the latter case the chinook, or dynamic heating, prevails.

SPECIAL CONTRIBUTIONS.

A WEATHER BUREAU KITE.

By Prof. C. F. MARVIN, U. S. Weather Bureau (dated March, 1896).

In this age of progress even the boy's kite is made to serve a useful purpose, and investigations are now being made under the special direction of Prof. Willis L. Moore, Chief of the Weather Bureau, with a view to employing kites for the purpose of sending meteorological instruments to high elevations, so as to gain better information respecting the nature and causes of atmospheric phenomena than can be done from observations at the surface of the earth.

We are sometimes told by naturalists and others that man is a descendant of the monkey, and that by processes of evolution the tail, among other characteristics, has been entirely dispensed with. Exactly this same sort of evolution is going on before our eyes to-day. Kites are rapidly losing their tails, and those of the future are sure to be made altogether without tails. Among the great variety of sizes and forms tried by the Weather Bureau, none have tails.

The one of which a detailed description is given in this article is selected for the reason that it is among the best, and at the same time is not very difficult to make.

A word here respecting the origin of kites of this character will be interesting to many readers, who will be surprised to find that as early as 1866 Wenham perceived the advantages of superposing two or more planes one above the other for the purpose of securing a large extent of sustaining surface for artificial flying machines. After many years, Hargrave, an indefatigable and very able inventor of flying machines in Australia, embodied Wenham's idea of superposed planes in his odd-looking box-shaped kites. The resemblance of these kites with their thin walls to a honeycomb with the ends of the cells open seems to have suggested to Hargrave that the kites be called cellular kites. Some made by him were employed for the purpose of sustaining himself at considerable heights in the air in order that he might the better conduct certain investigations.

Finally, in order to determine whether kites of the Hargrave type were suited to the needs of the Weather Bureau work, Mr. S. A. Potter, in October, 1895, made several cellular kites of different sizes. The trials were so successful from the first that kites of this type have been employed exclusively in subsequent investigations. Mr. Potter, it seems, was the first in the United States to successfully construct and fly kites of this kind. After a few trials he hit upon an important modification whereby the construction was greatly simplified, and the strength and lightness increased. This kite is described below and shown in the illustrations on Chart VIII.

The following description of a kite of convenient size is given with great minuteness, for the reason that there will probably be many observers who will be delighted and instructed to possess and fly one of these seemingly odd-shaped cellular kites.

When flown in a good breeze of 10 miles or more per hour the kite will pull quite as much as one can comfortably control without the aid of a special reel for managing the string.

Fig. 2 represents the kite as it appears when a short distance up in the air.

The kite contains 15 square feet of cloth, and should be flown with strong hemp twine. The exact kind of string is known on the market as "Cable-laid Twine No. 24." The cloth may be either of silk, or quite as well, of the finer and lighter grades of cotton, such as nainsook, lonsdale cambric, calico, etc.

It is very important that the wood used for the sticks be light and straight grained. Soft white pine is probably the best and most available material. Spruce is stronger, but more difficult to procure:

The following material is required in its construction:

4 pieces of pine, ¼ inch thick, ⅝ inch wide by 44 inches long. These are the sticks which appear at the top and bottom and at the side edges in the figure, and extend from one piece of cloth to the other:

2 short struts, ¼ inch thick, ⅝ inch wide and 15 inches long.

2 long struts, ¼ inch square by about 38 inches long, the exact length must be determined after the cloth has been put on:

2 strips of cloth, hemmed on both edges, 81 inches long and 13 inches wide after hemming:

12 wooden cleats will be needed, some 1-inch wire brads and a few 2-ounce tacks.

Having provided the above material the first thing is to make a frame such as shown in Fig. 3. The top and bottom sticks are two of the long thin sticks, the uprights are the two short struts given in the list above. Small cleats must be nailed with brads on the top and bottom of each strut in order to clasp the long pieces, as shown in the full-size view, Fig. 4. When the struts are finally in place, 7 inches from the ends of the long sticks, brads must be driven through the points so as to hold the long sticks from slipping in the fork. To make the frame rigid, wire ties must be added, as shown in Fig. 3. Soft iron wire used by tinners for holding stovepipes, etc., will answer. The wire should be passed through a small hole in the wood and fastened by twisting around the long pieces, *not to the struts*. In the absence of wire string may be used. The length of the wires must be just right so that the angles between the long pieces and the struts are right angles.

The next step is to prepare the cloth covering. The material is generally a yard wide. Of this, take a piece just 81 inches long, the ends should be torn, not cut off. They will then be true and square with the fibers of the cloth. The selvedge edges had best be hemmed, and this should be done before tearing the cloth lengthwise. After hemming, lay out one end of the cloth smooth and flat and measure from each hem inward 13½ inches. Cut the cloth at the marks for a distance of about half an inch and then tear the cloth entirely through, lengthwise, twice, thus forming two long strips, the raw edges of which must be hemmed. Lay out, in turn, each end of each strip smooth and flat on a table, and with a straight-edge draw a pencil line across the cloth just ½ inch from the end. The two ends of a strip are next brought together, overlapped and sewn together with two rows of stitching so that the two pencil marks coincide exactly. The cloth should now be in the shape of two endless bands.

The next step is to find the points at which the sticks are to be attached. Stretch each cloth band separately out smooth and straight over two thin sticks run through inside the band. It is well to make the seam in the band come exactly over the edge of one of the strips. When smooth and evenly stretched, draw a pencil line across the band exactly in the middle, where it turns around the edges of each stick. If the seam is placed at one stick the line already drawn should answer. Now, shift the band part way around on the sticks, so that the two pencil lines across the cloth will be exactly even with each other. These lines will then be exactly midway between the sticks. When this adjustment of the cloth has been accomplished, draw two more pencil lines at the edges of the sticks as before. Time and care spent in laying out these lines accurately on the cloth, so as to divide it into four exactly even portions, *when stretched*, will be well repaid in the even flying of the kite.

The cloth bands are next fastened to the frame shown in Fig. 3 by small 2-ounce tacks, driven exactly through one of the pencil lines which is placed directly over the edge of the frame. One edge of the band is made to come just even with the ends of the long sticks of the frame. The second band is attached at the opposite end of the frame with the edge of the cloth even with the ends of the sticks. Five or six tacks are sufficient on each mark, and when the cloth has been fastened to one edge of the frame the opposite mark on the cloth must be tacked to the opposite edges of the frame.

There are now two remaining lines on each band of cloth. At these marks the cloth is tacked to the edges of the two long thin strips of wood, in the same manner as just described, the edge of the cloth being fastened even with the end of the stick in each case. In fastening the cloth the pencil lines should be placed exactly over the middle of the edges of the sticks.

All that remains is to finish up the two long cross struts. On one end of each of these cut out a notch, as shown in Fig. 5 and nail on a cleat so that it shall appear as shown in Fig. 6. Place the fork thus formed over one of the loose strips attached to the cloth at the side of the kite, and stretch the band taut. Make a mark on the unfinished end of the strut, showing the depth at which to cut a notch and form a fork like the one shown in Fig. 6, which, when finished, will clasp the remaining loose stick of the kite, and stretch the cloth up taut as a drum head.

When the long struts are placed finally in position, they should be forced down against the short upright struts and the two firmly tied together by wrapping with waxed string. A brad should be nailed through the cloth and the forks at each end of the long struts so that this cannot slip on the side sticks.

The kite is now ready for the bridle or bellyband, and it makes no difference which side of the kite is uppermost, or which cell is made the forward one. In some respects it is best to dispense with the bridle and fasten the string directly to the lower stick of the truss, shown in Fig. 3, but as the best point can scarcely be located without trial and as new holes must be made in the cloth if the string is shifted, the former arrangement is more convenient. The bridle is made of a piece of strong twine and is tied to the frame, as shown in Fig. 3. Small holes are pierced in the cloth so that the twine may be run through, around the stick, and out. The length of the twine must be such that when drawn taut and laid over against the cloth of the kite the bellyband appears as shown at *A*, *B*, *C*, Fig. 7, which also shows how the main line is fastened. The correct knot to make in tying the main line to the bridle is the well-known weaver's knot, with a loop, shown in Figs. 8 and 9. It cannot possibly slip and yet can be untied simply by pulling the loose end of the string. This is desirable as the point of attachment needs to be changed sometimes to get the best effect. A foot or two of string should be left tied to the bridle so that the point of attachment need not be changed when the kite is taken down and detached.

Those who desire to get the very best results will find it an advantage to round over all the edges of the sticks, not only

that the cloth may not be injured but that the sticks may weigh less and cut through the air with less resistance than if left with perfectly flat surfaces. This applies particularly to the struts, cleats, etc. When completed the kite should weigh about 16 ounces.

Finally, the kite can be made much more rigid by fitting it with a set of string or wire ties. These may be placed outside the cloth and should connect all the corners of the interior frame work.

To fly the kite.—Unless the wind is very strong the safest way to start the kite in flight is to run out 150 feet or so of twine while the kite is held by an assistant. When all is ready the assistant may toss the kite upward a little in the direction in which it is to go. It will take care of itself afterwards. It is important the kite be cast off directly in line with the wind, otherwise it may seem to dart badly. The object of this method is to get the kite quickly above the irregular and greatly disturbed air currents near the ground, and give the kite more room to dart about with less danger of striking anything until it gets into steady currents. When fairly up these kites may sweep a little from one side to the other, but if they ever dart or turn over, there is something radically wrong, probably due to an uneven distribution of the cloth surface, or some permanent distortion of the frame work. Sometimes the weight of the wood varies and one side is heavier than the other. This should be corrected by weighting the light side with a small strip of sheet lead, or otherwise.

If the wind is very light a finer twine may be used in flying, and it may be necessary to run a little with a long string out, in order to get the kite into upper and more rapidly moving currents.

When the wind is very strong drop the ball of twine on the ground so that the cord can pay out rapidly and let the kite go up directly and quickly from the hand.

Tandem kites.—Several kites can be sent up on the same line. When an additional kite is to be sent up it must be first carried out, say 100 feet attached to a separate line of this length, the end being tied to a loop formed in the main line. When all is ready the kite is tossed up as already described.

Fine wire is the only suitable material to be used for flying kites at the very greatest elevations. Steel piano-forte wire capable of sustaining over 200 pounds will weigh about half as much as hemp twine of the same strength. A still more important advantage, however, is the fineness of the wire, the diameter of which will be about one-fifth that of twine. The wind presses against the coarse twine with a seriously detrimental force, whereas the fine wire cuts through with but little resistance. The wire employed by the Weather Bureau is just about the thickness of an ordinary pin.

In Franklin's famous kite experiments, in which he drew lightning from the clouds, the wetted string became the conductor of the electricity, and, in recent experiments a fine copper wire was used with the kite string, the former conducting the current and the latter flying the kite. When wire alone is used the electrification is considerable at all times, and with two or three thousand feet of wire out, sparks an inch or more long may be drawn from the wire.

When recording meteorological instruments are sent up they are attached to the wire below the kites.

The proportions of the kite may be varied considerably without impairing its flying qualities, and the size can be changed to any extent.

FLUCTUATIONS OF THE WATER LEVEL IN THE GREAT LAKES.

By Ossian Guthrie, C. E., Chicago, Ill. (dated Feb. 14, 1896).

The unprecedented and long continued low stage of water in the lakes has been the occasion of much discussion, and to those interested, but unfamiliar with their irregular source of supply, has been the cause of much alarm; and added to this natural cause the proposition of Chicago to divert 600,000 cubic feet of water per minute through her drainage channel, now nearly completed, has greatly increased the popular anxiety.

I shall endeavor to show that neither the present low stage of water nor the proposition to divert 600,000 cubic feet of water per minute through the Chicago drainage canal need cause any serious alarm, but on the contrary, I shall encourage the hope that ultimately there will result a greatly improved condition of the lakes for navigation.

The same varieties of trees now growing in the Lake Region were growing soon after the close of the Glacial epoch; hence we conclude that no climatic change has taken place during the past several thousand years. If this conclusion is well founded, the rainfall will continue, and as the lakes are supplied entirely by the precipitation that falls upon the area of their basins, their levels will be maintained as heretofore. If the rainfall is heavy or light the stage of water in the lakes will be correspondingly high or low, as has invariably been the case heretofore, although as a rule the effect of increased or diminished precipitation has been seen the following year, but not always so. The year 1876 was one of heavy rainfall and of high stage of water. In the latter part of the year Lake Michigan reached 2.56 feet above datum. The maximum effect of a heavy snowfall after January 1, followed by early and heavy rainfall, would undoubtedly be seen the same year, while the same amount of precipitation in reversed order would not be seen until the following year.

The Chicago drainage channel diverting 600,000 cubic feet of water per minute [for a whole year] would reduce the level of Lakes Michigan and Huron a fraction less than 3 inches in a year, but the peculiar annual rise and fall of the lakes would reduce this effect by a large percentage, especially during the season of navigation. On an average these lakes are 14½ inches lower at the end of winter than in July. Now suppose the drainage channel had drawn their level 3 inches last year, the flood of next spring would flow directly into this void and restore the levels of last year instead of being wasted in an excessive spring outflow over Niagara Falls, and we would begin on the second year's drawing substantially where we began the first. But notwithstanding these arguments the public has become greatly excited, and the subject has been discussed as it never would have been under ordinary conditions, and consequently the fluctuations of the lakes, their source of supply, and their past and future history, are now better understood than ever before. We find upon investigation that a dam at the outlet of Lake Superior 5 inches high would hold back a supply for the Chicago drainage channel for a year, and that dams or controlling works can be constructed at the outlets of lakes Superior, Huron and Erie, which would not only maintain a nearly uniform stage of water throughout the season of navigation, but also nearly tide us over a short series of dry years with water which now goes to waste. As an illustration, the water power of the Merrimac River would be of little value without her artificial storage basins for flood water. This idea is by no means new, but public attention has been focused upon a prodigal waste of such magnitude that it has become a matter of national concern. Let me give you a few figures: The total basin area of the lakes contains about 230,000 square miles. In round numbers an acre is 209 feet square. There are 640 acres in a square mile, and upon each acre from 20,000 to 25,000 barrels of water annually fall.

The belief is quite common that the lakes rise and fall through a uniform series of seven years. This belief is absolutely without foundation. The fluctuntions are as irregular

as the precipitation that falls upon their basins, and is their only source of supply.

In 1887 I had occasion to make a table showing the average precipitation upon the basins of Superior, Huron, and Michigan, for a period of about twenty years. This average I found to be 35.65 inches, and the average stage of Lake Michigan during the same period, 1.65 above datum. For the purposes of this article I have done the same thing for a series of eight years, 1888 to 1895, both included. The precipitation during this period averaged 30.44 inches. Lake Michigan fell from +2.64 feet in 1886, the end of a long wet period, to +1.96 in 1887, and to +1.30 in 1888, and finally to —0.5 foot in 1895. Further illustrations upon this point will be found in the following table, which shows the average level of the lake at Chicago for each year. The levels are referred to the adopted datum plane or low water of February and March, 1847.

Chicago datum was established in February or March, 1847, by Edward B. Talcott, chief engineer of the Illinois and Michigan Canal, and Alfred Guthrie (my father), designer and chief engineer of the Canal Pumping Works, which were to supply the summit level (30 miles) with water from the Chicago River (Lake Michigan). It was necessary to place the foundation of these works at a certain point below extreme low water. The unparalleled low stage then prevailing seemed to justify its adoption, and since then it has been the standard.

Many people, especially sailors, believe that the Great Lakes have subterranean sources of supply. This, it seems to me, is disproved by the fact that the lakes are lowest in winter and highest in summer, and always begin to rise as soon as the ice and snow melt in the spring.

Year.	Height.	Remarks.	Year.	Height.	Remarks.
1859	2.98		1879	1.06	Fall in 3 years, 1.50 feet.
1864	1.57	Fall in 5 years, 1.41 feet.	1880	1.26	Lakes continuously high 1880–1886, inclusive. Rainfall 46 inches in 1886.
1865	1.30		1883	2.10	
1866	1.07	Fall in 7 years, 1.91 feet.	1886	2.64	
1867	1.49		1889	0.77	Fall in 3 years, 1.87 feet.
1868	1.01	Fall in 9 years, 1.97 feet.	1890	0.63	
1869	1.13		1891	0.06	
1870	2.09	Rise in 2 years, 1.08 feet.	1892	—0.17	Fall in 6 years, 2.47 feet.
1872	0.81	Fall in 2 years, 1.28 feet.	1895	—0.50	
1876	2.56				

NOTES BY THE EDITOR.

THE CHEMICAL STORM GLASS.

In response to a request from one of our esteemed observers, the Editor would say that the "chemical storm glass," sometimes called "Fitzroy's weather glass," ought not to be considered as in any way a substitute for the mercurial or the aneroid barometer. Meteorologists cannot encourage the application of the word barometer to any instrument except such as measure the pressure or the changes in pressure of the atmosphere. If a hygrometer or a thermometer indicates the approach of a storm, that is no good reason for calling it a barometer.

As a general rule, in our country the temperature rises before a storm and falls afterwards, so also the wind changes, the clouds change, and the humidity rises. If, as an additional help in observing and predicting storms, the observer wishes to know something about the pressure of the air, he must get the genuine barometer and not the chemical storm glass. The substances in these storm glasses are made according to various recipes, some of which are the secrets of the makers (usually camphor and sal ammoniac dissolved in alcohol and water), but in all cases, so far as the Editor knows, the tubes are hermetically sealed and the changes that are apparent in the solution within them are due to the temperature of the solution and to the rate at which this temperature has been changing for a few hours before the observation. There may be cases in which the action of the daylight is appreciable. If any observer has recorded carefully the behavior of his chemical storm glass during a month or year, we shall be glad to have him investigate wherein its indications are better than those of his thermometer.

EVAPORATION.

The quantities of water added to the atmosphere daily by evaporation from the oceans and the continents constitute a fundamental consideration in meteorology; the quantities evaporated from cultivated fields, forests, and other forms of vegetation are equally important in agriculture, but as yet we have confessedly attained to only a very imperfect knowledge of this subject. Meteorologists have generally observed the amount evaporated from a small surface of water exposed either in the open air and sunshine, or else within such a shelter as is used for the open air thermometer; lately a disc of moist paper has been substituted for the surface of water, as in the Piche evaporometer. Agriculturists, on the other hand, have made use of the lysimeter, which consists of a deep metallic box buried in the earth and having its open upper side flush with the surface of the ground. This box is filled with soil in which plants may or may not be growing, according to the object of the investigator. Record is kept of the amount of water or rain that is added to the lysimeter box from day to day, and also of the amount of water that drains from the bottom of the box. The difference between the two is adopted as the natural evaporation from the soil. The soil in the box may be kept very wet, to imitate a morass, or very dry to imitate a desert; the fineness of the soil may vary from coarse gravel to the finest silt.

If we desire the actual amount evaporated into the atmosphere we must do more than record the results of the above forms of apparatus. The evaporating surface of water in the shaded thermometer shelter will indeed give up its moisture in proportion to the temperature of the water and to the velocity and dryness of the wind at its surface, but these three important factors have values so different out of doors from those within the shelter that such records can, at the best, only give us a crude idea of the actual evaporation from surfaces in the open air. A great evaporation within the shelter, caused by a strong, hot dry wind, may be accompanied by but little evaporation from the surrounding country if the latter be a desert of rock and gravel.

On the other hand, by means of the lysimeter, one may indeed determine directly the evaporation from soil of any character exposed to the natural outdoor conditions, but there then remains the difficult task of determining how much soil of each respective kind really occurs in the surrounding territory. In order, therefore, to determine the actual evaporation from land surfaces one must observe a large number of lysimeters and make an extensive minute survey of the country. The calculations incident to this latter method are very laborious.

The ordinary psychrometric observations give the dew-point or quantity of moisture in a small unit volume of air at any moment. If in the course of the day this quantity increases we are not thereby warranted in concluding that the increase is due to a local evaporation, it may have been brought from a distance by the wind, or it may even have

come down from the clouds as rain. If observations of dew-point are carefully made on all sides of a large field, over which a gentle wind is blowing and if it should appear that there is a little more moisture in the air on the leeward side than on the windward side one might conclude, provisionally, that this increase represented the quantity of moisture thrown by evaporation into the air as it gently moved over the surface of the field. But even this conclusion must be modified indefinitely by the consideration that in blowing across the field the wind does not move horizontally, but in a series of rolls and whirls by which the lower air in which we are observing becomes mixed with upper air, about whose moisture we know little or nothing.

In the midst of all these uncertainties it seems almost hopeless to attempt anything like an accurate determination of the moisture actually added to the atmosphere by evaporation from any extensive region of land or water; the question is far more complex than the determination of the evaporation from a reservoir of water, which latter problem is often attacked by the hydraulic engineers. Including the earth and its atmosphere in one comprehensive view, we may certainly say that the total annual evaporation from snow and ice, fresh water and salt water, must average the same as the total annual precipitation. We may even make an annual average for each continent, and say that the evaporation from the land plus the water that flows away in the rivers must equal the rainfall, and as the river discharge is frequently well known, we may, by subtraction, infer the evaporation. For the oceanic surface, on the other hand, the evaporation must equal the rainfall plus the river discharge from the continents.

The latest contribution to our knowledge of evaporation from land surfaces is published by Prof. E. Wollny of Munich, at page 486, Vol. XVIII, of his "Forschungen." As the result of three years continuous observation of five lysimeters and a neighboring evaporometer, he concludes:

1. That the quantity of moisture evaporated from the soil into the atmosphere is considerably smaller than that evaporated from a free surface of water.

2. That the evaporation is smallest from naked sand, and largest from naked clay, whereas naked turf and humus or vegetable mould have a medium value.

3. That the evaporation is increased to a considerable extent by covering the ground with living plants.

As the result of a minute analysis of the complex relations between the evaporation and the meteorological elements, on the one hand, and the physical features of the soil on the other, Dr. Wollny further concludes as follows:

4. Evaporation is a process that depends both upon the meteorological conditions and on the quantity of moisture contained by the substratum of soil.

5. Among the external circumstances temperature is of the greatest importance, inasmuch as, in general, evaporation increases and diminishes with it, but this effect is modified according as the remaining factors come into play, and in proportion to the quantity of water supplied by the substratum.

6. The influence of higher temperature is diminished, more or less, by higher relative humidity, greater cloudiness, feebler motion of the wind, and a diminished quantity of moisture within the soil, whereas its influence increases under opposite conditions. On the other hand, low temperatures can bring about greater effects than high temperatures if the air is dry, or the cloudiness small, or the wind very strong, or if a greater quantity of water is present within the evaporating substance.

7. For the evaporation of a free surface of water, or for earth that is completely saturated with water, the important elements are, first the temperature, next the relative humidity of the air, and then the cloudiness, direction and velocity of the wind; whereas, for the ordinary moist earth, no matter whether the surface is naked or covered with living plants, it is the quantity of rain upon which the soil depends for its moisture that is the important additional consideration. The effects of the external elements on evaporation become less important, as explained in paragraph 5, in proportion as the precipitation is less and as the soil is more completely dried out by the previous favorable weather, and *vice versa*. For these reasons the rate of evaporation from a free surface of water not infrequently differs largely from that from the respective kinds of soil.

8. Free surfaces of water, and soils that are continuously saturated, evaporate into the atmosphere on the average more water under otherwise similar circumstances than soils whether naked or covered with plants and whether watered artificially or naturally. Only at special times, viz, when the influence of the factors that favor evaporation is most intense, when the plants are in the most active period of growth, and when the soil contains a large percentage of water can the land that is covered with plants show a larger evaporating power than the free water surface.

9. When a soil that is not irrigated is covered with plants it evaporates a far greater quantity of moisture than when the surface is bare. In the former case the evaporation can not exceed the quantity received by the soil from the atmosphere before or during the period of growth. Swampy lands and those that are well irrigated, as also free surfaces of water, can, under circumstances favorable to evaporation, sometimes give to the atmosphere a greater quantity of water than corresponds to the precipitation that occurs during the same time.

10. The evaporating power of the soil is, in itself, dependent upon its own physical properties; the less its permeability for water, or the larger its capacity for water and the easier it is able to restore by capillarity the moisture that has been lost, by so much the more intensive is the evaporation. For this reason the quantity evaporated increases with the percentage of clay and humus in the soil, whereas it diminishes in proportion as the soil is richer in sandy and coarse-grained materials.

11. Soil that is covered with plants loses by evaporation so much more water in proportion as the plants are better developed, or stand thicker together, or have a longer period of vegetation, and *vice versa*.

In conclusion, Wollny repeats that the use of apparatus giving the total evaporation from free water surfaces does not respond to the needs of the agriculturist [and we may add of the meteorologist] but that instruments must be used for measuring the evaporation from masses of earth that are wet with rainfall only and free from stagnant wet soils. Lysimeters are recommended having a section of one-tenth of a square meter and a depth of soil one-half of a meter and set out in the open air sunk flush with the surface of the ground and arranged so as to be easily weighed at any moment and so that the drainage water can easily be measured.

[NOTE.—The above results of Wollny's laborious observations confirm us in the general conclusion that the quantity of water actually evaporated from a large surface of land, such as a definite watershed maintaining a single river, can only be determined by the following considerations: The quantity of water contained in the soil at the end of any given period in excess of what it contained at the beginning, plus the water that is carried off by drainage and river flow, plus whatever is evaporated into the atmosphere either directly or through the crops and forests, must equal the rain and irrigation water added to the soil during that time. As the soil content of water, the riverflow and drainage, and the rainfall can be severally determined by direct observation far better than the evaporation, the latter is to be determined by taking the difference between the rainfall and all other sources of loss or consumption.]

A WAVE OF DARKNESS.

At Pittsburg, Pa., between 10 and 11 a. m., November 9, during a storm of rain and wind a period of great darkness occurred. The shade came up the Ohio Valley from the northwest like the shadow of an eclipse. It seemed to be produced by an area of low sweeping clouds broad enough to cover the heavens and dense enough to cut off all light from above. Business was suspended and the streets were filled with people looking upward anxiously. When the darkness was at its height the sudden dawning of a spot of silver brightness, low down on the horizon, over the Ohio brought relief. This was the rear guard of the darkness and beneath the bright spot its reflection in the river appeared like molten silver. Three such waves of darkness and light are said to have occurred successively, each one taking but a few minutes to pass.

[NOTE.—The weather map of November 9 shows that a cold wave was at this time about to pass over western Pennsylvania, and that the advancing front of a belt of cloud and rain was at this time a little to the northwest of Pittsburg and moving southward. Such a belt is usually marked by a series of several long parallel clouds, representing either the crests of great atmospheric waves or the tops of great atmospheric breakers, similar to those of the ocean surf or to the tidal bore that advances up the coast of converging inlets and river deltas. The observer at Pittsburg seems to have caught a series of observations beneath these successive wave clouds as they rolled over the city of Pittsburg. The depth or thickness of such a cloud is approximately indicated by the darkness beneath it and as the heaviest thunder clouds, hail clouds, and tornado clouds produce similar degrees of darkness it is fair to presume that the clouds at Pittsburg were as deep as those. The local topography greatly affects the style, the thickness, and the motion of the clouds, and it may be rare to observe three such clouds as occured at Pittsburg in succession, but it is a very common phenomenon to notice the great darkness that occurs whenever any heavy cloud, especially those with hail and rain pass over a station. Several similar waves but much thinner and at much greater distances apart are commonly observed at Washington whenever a northwest wind breaks over the Appalachian Mountains, and runs under the air of the Atlantic Slope. The distance apart of such crests in time and in miles should be determined whenever possible.]

LONG-RANGE FORECASTS IN OREGON.

The following extract from the weather synopsis and general forecast by Mr. B. S. Pague, Local Forecast Official at Portland, Oreg., was published on his morning weather map for November 12, 1895.

The first winter storm of the season is shown on the map this morning. The conditions, as shown, are those peculiar to the winter season and represent the passage of the dry season and the appearance of the wet season. On April 20 last, the first type of summer, dry conditions appeared. It was then stated that from this date, April 20, the rain would be light and of a local, more than a general, nature. The conditions from April 20 to date show how well the remarks then made were verified. The phenomenal dry season, which has prevailed over the Pacific northwest for the past six weeks, was due to the storm areas passing from the north, east of the Rocky Mountains, to the southeast toward the Great Lakes; usually, the storm areas have this movement during the months from June to the middle of September, when they assume their winter course, and move southward along the coast line striking land about Vancouver Island, then moving eastward, or at times move in other directions. The period of dry weather is now over; it is probable that short periods of fair weather may prevail, but it is not probable that any extended period of fair weather will again prevail until next spring. Since April 20th last the conditions were more in favor of dry weather than of wet weather, from now on the reverse of this will be true.

The precipitation over the Pacific northwest, since January 1, has been about 30 per cent deficient, and it is reasonable to assume that for the remainder of the year there will be an excess.

[NOTE.—The importance of long-range predictions, especially when based upon a broad study of atmospheric conditions over the whole globe, cannot be overestimated. The changes in the course of storm tracks may be spoken of as either the cause or the concomitant of changes in the weather and climate. In a narrow sense they are the cause, but in a broader sense they may often be considered as simply accompanying or correlated phenomena. The weather on the immediate coast of Oregon and Washington depends so largely upon what is called the general circulation of the atmosphere over the North and South Pacific oceans that it may be reasonably hoped that the study of this latter subject will elucidate the matter and render these seasonal forecasts highly accurate and satisfactory.]

OBSERVATIONS AT HONOLULU.

Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.

Pressure is corrected for temperature and reduced to sea level, but the gravity correction, —0.06, is still to be applied.

The absolute humidity is expressed in grains of water, per cubic foot, and is the average of four observations daily.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 10.

The rainfall for twenty-four hours is given as measured at 6 a. m. on the respective dates.

October, 1895.	Pressure at sea level.			Temperature.					Humidity.			Wind.		Cloudiness.	Rain measured at 6 a. m.
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Maximum.	Minimum.	Relative. 9 a. m.	Relative. 9 p. m.	Absolute.	Direction.	Force.		
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%					*Ins.*
1 ..	30.02	29.93	30.01	70	82	73	83	70	68	81	7.2	ne.	2	2	0.00
2 ..	30.04	30.00	30.08	73	82	74	84	71	64	85	7.8	e-s-n.	1	3	0.00
3 ..	30.09	30.61	30.07	73	84	78	84	72	75	71	8.0	ene.	2	4	0.09
4 ..	30.04	29.93	30.02	74	82	76	84	70	64	70	7.1	nne.	4-1	2	0.00
5 ..	30.01	29.94	30.02	69	81	76	83	68	63	70	7.0	ne.	2	3	0.00
6 ..	30.05	29.97	30.06	73	82	74	83	71	64	78	7.0	ne-n.	2	2	0.00
7 ..	30.08	30.01	30.06	75	81	74	82	71	69	80	7.2	nne.	3	4	0.00
8 ..	30.00	30.00	30.07	75	81	76	83	73	66	70	6.9	ne.	3	4	0.07
9 ..	30.05	29.97	30.05	74	80	77	83	72	64	65	6.7	ne.	4	3	0.04
10 ..	30.04	29.97	30.04	75	82	75	82	73	67	70	6.9	ene.	3	4	0.01
11 ..	30.05	29.96	30.02	75	82	76	83	75	61	66	6.3	ne.	3	1	0.03
12 ..	29.98	29.89	29.94	67	79	70	80	66	64	80	6.8	n-s-e.	2	7	0.13
13 ..	29.90	29.80	29.90	66	80	72	81	66	70	80	7.0	w-s	2	0-3	0.06
14 ..	29.94	29.87	29.95	70	81	72	83	67	70	80	7.0	n.	1	0-3	0.30
15 ..	30.00	29.92	29.99	68	82	77	83	66	68	72	7.0	ne.	3	1	0.00
16 ..	30.02	29.98	30.02	70	86	78	87	70	75	79	8.2	n-s.	1	3-6	0.00
17 ..	30.02	29.97	30.04	73	83	75	86	72	75	89	8.4	s.	2	3-7	0.00
18 ..	30.04	29.95	30.00	73	82	78	86	73	70	75	7.9	n.	3	8	0.08
19 ..	30.00	29.92	29.97	72	83	75	86	71	72	86	8.1	s.	2	4	0.01
20 ..	29.97	29.90	29.97	74	84	75	85	71	72	81	7.9	s.	2	10-3	0.00
21 ..	29.94	29.87	29.93	71	82	73	85	71	75	85	7.7	s.	2	8-4	0.00
22 ..	29.94	30.90	29.98	72	79	72	85	71	75	90	8.1	s.	1	1-6	0.00
23 ..	30.03	29.96	30.05	68	84	73	86	68	75	85	7.8	e-s.	1	3	0.27
24 ..	30.08	30.00	30.05	75	82	78	84	70	68	73	7.7	nne.	3	4	0.00
25 ..	30.06	29.95	30.02	75	79	77	82	74	75	77	8.0	nne.	3	5	0.00
26 ..	29.98	29.89	29.98	75	81	77	83	73	78	76	7.8	ene.	3	3	0.20
27 ..	30.02	29.93	30.01	70	81	77	82	70	72	76	7.8	ne.	1-3	4-2	0.15
28 ..	30.06	29.96	30.03	72	80	75	82	72	85	70	7.6	nne.	4	8-2	0.16
29 ..	30.06	30.00	30.08	73	78	77	82	69	73	71	7.4	nne.	3	7	0.05
30 ..	30.09	30.01	30.06	73	81	77	83	73	69	71	7.1	ne.	4	3	0.07
31 ..	30.08	29.99	30.07	76	81	77	83	76	60	75	6.9	ne.	3-5	5	0.01
	30.01	29.94	30.02	72.2	81.5	75.3	83.5	70.8	69.1	76.7	7.4	.....	.....	.....	1.38

The monthly summary for October is: Mean temperature, 6+2+9+3 was 76.3; the normal is 76.5; extreme temperatures, 87° and 66°.

Relative humidity 3 per cent above normal.

DO THUNDERSTORMS MOVE AGAINST THE WIND?

In a letter of February 10, 1896, Mr. G. W. Richards, Voluntary Observer, Maple Plain, Minn., says:

From my observations of several years in this section, I find that our heaviest storms move from the southwest, west-southwest or west, and are accompanied, or at least preceded, by surface winds ranging from southeast, east or northeast, and that there is a greater likelihood of a storm passing over this region if the wind direction makes an angle of from 135° to 180° with the direction of motion of the rain cloud than if it makes an angle of only 90° or quarter-wise. With the wind from the south, or quarter-wise, there seems to be a greater tendency of the showers to pass around to the northward. It seems that with east winds and with showers advancing from the west or southwest we are more in the line of the showers' path than if the wind were coming from a more southerly direction. If the shower is of great intensity it frequently happens that the east wind will subside about the time when

the storm reaches here and there will be quite a blow outward from the storm. This will soon be over, and then the wind becomes again easterly before the shower is over, and quite likely there will be a further series of showers. The same may be said of our winter snowstorms. Most of these move with the surface wind blowing at an angle of 135° to 180° with the movement of the cirrus, the cirro-stratus, and the attendant pallium haze. Our heaviest snowstorms move from the southwest attended by east to southeast winds.

PENETRATION OF SNOW BY BULLETS.

According to the French journal Cosmos, Vol. XXX, p. 386—

The officers of the 439th regiment of French infantry, in garrison at Aurillac, made some experiments in February, 1895, on thee ffect of shooting rifle balls into the snow from the Lebel rifle, and arrived at some very unexpected results. Heaps of snow varying in depths of from 1 to 2 meters were raised on the shooting grounds at Ombrado and Buis, near Aurillac, and the soldiers fired into them from a distance of 50 meters (164 feet). The Lebel ball only penetrated to a depth of 1.75 meters (5.7 feet). The cause of this phenomenon has not, as yet, been discovered. It is suggested, however, that by reason of its great velocity and rotation the ball attracts to itself an increasing mass of ice that finally destroys its power of penetration.

The above paragraph suggests an exceedingly interesting subject for careful experimental investigation. Will solid ice act as effectually as snow in stopping a rifle ball? Does hard packed snow resist the ball better than light drifted snow? Does the ball really gather about itself a large mass of snow-ice, or is the accumulation mostly in the rear and following after the ball?

ANCIENT CLIMATES NEAR CHICAGO.

The discovery of clearly-defined ancient lake beaches and layers of driftwood long since buried under the sand at the southern end of Lake Michigan has led Mr. Ossian Guthrie to compile a short account of this subject, from which we make the following brief extracts:

Nearly parallel with the shores of Lake Michigan and from half to three-fourths of a mile to the west of it is the beach of an ancient lake sloping to the west. The surface of this lake was about 12 feet above the present level of Lake Michigan, and on its eastern shore are buried the trunks and fragments of an ancient forest. * * * In 1871 the trunk of an immense white oak tree was found at the bottom of a trench when excavating for the main sewer in Michigan avenue south of Thirty-fourth street. In 1881 the trunk of an oak tree was found several feet below the ground at the corner of Lincoln and Belden avenues. In the same year the trunk of a white oak, stripped of its branches, without root or stump, 60 feet long and 2 feet in diameter, was found while excavating for a sewer in Forty-eighth street near Prairie avenue. In 1885, at the corner of Thirty-fourth street and Indiana avenue, the trunk of a large white oak was found, the under side of which had been flattened and cut away almost to the center, but there was no evidence of the work of man. In 1888, and near the location of the find of 1871, Mr. Guthrie discovered the bed of an ancient lake, completely covered with driftwood. During 1895, at Thirty-ninth street and Forest avenue, a large white oak trunk was found 11 feet below the surface. At Thirty-eighth street and Indiana avenue, 8 feet below the surface, a space 110 feet by 160 was completely excavated, and the general slope of the beach of the ancient lake could be determined; but below this first beach there was found an older beach, and it is possible that others are still below that.

During the Glacial epoch the basin of Lake Michigan was filled and covered to a great depth with ice in the form that constitutes a glacier. When the ice melted away at the southern end of the lake the glacier was still firm enough to choke up the north end of Lake Michigan, and the melted water constituted a lake whose level was probably 50 feet above the present level, as is proven by the remnants of the old beach line still to be found in various parts of the country. The many varieties of wood—elm, willow, white oak, butternut, and black walnut—are found here in promiscuous confusion, seeming to preclude the possibility that they grew where they are buried. The flattened and sand-rubbed surfaces of some of these trunks show that they have been drifting about and dragging and rubbing their sunken portions upon the sandy bed of the ancient lake.

During the Glacial period the Des Plaines River was entirely tributary to the Mississippi River, but at the close of the period it was entirely tributary to Lake Michigan. After awhile a sandbar was formed, by reason of which the Des Plaines became again tributary to the Mississippi; but subsequently the bar was broken through, and it flowed into Lake Michigan through the new channel, or what is now the south branch. Finally came the present condition, in which the river is mainly tributary to the Mississippi. All these changes have been the result of the action of ice and water, rain and wind. The heavy north winds built the 5 miles of sandy plains in the Calumet region, by reason of which the southern end of the great inland lake was filled in. If these processes at the south end of Lake Michigan be traced back to their connection with the changes going on at Niagara Falls, they give us six or eight thousand years as the approximate interval that must have elapsed since the disappearance of the Glacial ice in Lake Michigan. We infer that at that time the climate was not so greatly different from that which now prevails and that the same varieties of timber that are growing now could also flourish then.

STORM WAVE AT SAUSALITO.

On Monday, November 11, the automatic tide gauge maintained by the U. S. Coast and Geodetic Survey at Sausalito, near San Francisco, recorded an unusual series of rapid fluctuations. These began about 8.20 a. m., and continued for eighteen hours, or until 2 a. m. of Tuesday, without intermission, but with a slight diminution of intensity. This disturbance was apparently not due to an earthquake at some distant point in the Pacific Ocean, although such are frequently recorded on the gauge. Neither could it have been caused by a storm of short duration but great intensity, such as that which had a short time before passed over La Paz in Lower California. The present disturbance, consisting of about twenty-five large fluctuations, was in all probability due to some one of the greater hurricanes that last for many days. Such storms as they move onward continue growing up to a maximum stage of development, after which they break up or die away. The whole region of the ocean over which they pass is lashed by the winds into a terrible sea, whose waves, spreading out in all directions, are easily recorded on such gauges as that at Sausalito. It has been suggested that we have here a record of waves emanating from the hurricane encountered during the 15th, 16th, and 17th, by the steamship *Tacoma*, which left Yokohama on the 10th and arrived at Victoria, B. C., on the 27th. But that hurricane, which was southeast of Kamschatka on the 15–17th, must have been much nearer Japan and of much smaller extent on the 10th. Its track on this latter date was probably at a distance of about 70° or 75° of a great circle, or perhaps 5,000 statute miles west of San Francisco, and its waves would require twelve hours or more to reach Sausalito.

In the MONTHLY WEATHER REVIEW for May, 1877, pages 9 and 10, the present editor gave some data for determining the average velocity of very large waves across the Pacific Ocean, from which it appeared that the first great wave moved from an earthquake center on the coast of Peru to Honolulu, or through 96° of the great circle in fourteen hours, and therefore at the average hourly speed of 6.8°. This was much larger than the speed when passing over shallower portions along the coast of the Pacific. It was also larger than the speed of the succeeding waves, and especially of the maximum wave, which fact simply shows that the first waves, moving with greater speed, flattened out, and perhaps even disappeared, while the slower speed of the maximum wave was really the speed of a group of waves. When a group of waves runs along in smooth water under a calm the individual waves can be seen to be always, as it were, running forward through the group and dying out in front so that in deep water the speed of the group, as a whole, is about one-half that of its individual components, but in shallow water they may equal each other. In strong storm winds the same rule holds good. The average measured speed of large storm waves is given as follows at page 28 of the Navigator's Handbook for the Indian Ocean, published in German in 1892 by the Seewarte at Hamburg:

In the region of the trade winds the average length of the waves of the Indian Ocean is 96 meters (315 feet); the periodic time, 7.6 seconds; the rate of advance of the crest, 12.6 meters per second (28.2 miles per hour).

In the region of the strong west winds in the southerly part of the South Indian Ocean the average length of the waves is 114 meters (374 feet), the periodic time is 15.0 seconds, the rate of advance of the crest is 15.0 meters per second, or 33.6 miles per hour.

The size and speed of the waves stand in a rather complex relation to each other, but in general the longest waves go the fastest. The speeds of individual waves are greater than the progress of appreciable disturbances. As a wave proceeds outward and gradually diminishes in its amplitude as the distance from the center increases, it comes soon to a region where it may be said to have died away; but the successive arrival at this outer limit of the following stormwaves finally builds up an appreciable wave, and the limit of inappreciable disturbance is pushed farther beyond. In this way the circle of disturbance slowly spreads to a great distance over the ocean, but the rate of spreading is far slower than the rate of progress of the individual waves. The progress of the above-mentioned earthquake wave from Peru to Honolulu, at the rate of 6.8° per hour, is the rate peculiar to a very long and flat primary wave moving over very deep water, while the rate above given for the wind waves of the Southern Indian Ocean relates to a comparatively steep and short wave. The longest waves that have been measured during storms at sea are also given in the above-mentioned German publication as 830 meters (2,723 feet). Another long one was measured in the South Atlantic Ocean at 590 meters (1,936 feet). The highest waves that have been reliably measured are 11.5 meters (37.7 feet), in the Southern Indian Ocean, and in the same region waves of 7 meters (23 feet) high were measured by the *Challenger*. These heights are the vertical distances from the bottom of the trough to the top of the crest.

When very long and flat waves pass from the deep ocean water into shallower, they become shorter, steeper, and slower, and *vice versa*. The waves that sometimes pass as earthquake ocean waves very rapidly across the Pacific are of this character. The theoretical speed of such waves is but little less than that of the long, flat, tidal waves, and depends principally upon the depth of the water. The following figures for tidal waves are quoted from Lamb's Hydrodynamics, London, 1895, p. 274:

Ocean depth.	Velocity per hour.	
	Nautical miles.	Degrees of a. G. C.
Feet.		
1,250	120	2
5,000	240	4
11,250	360	6
20,000	480	8

In the tidal wave proper the motions of the individual particles of water are nearly horizontal, but in surface waves they are nearly vertical.

It is sufficient for our present purpose to say that the first wave observed at Sausalito must be tracked backward at the rate of about 6° or 7° per hour, if we wish to determine the time and place of its origin. A circle of 40° radius, or from 6.7 to 5.7 hours of time, would pass through the equator south of San Francisco as its center, or through Honolulu southwest of that center. This circle would not quite reach to Unalaska, but would extend beyond Sitka. It is quite likely that we have to seek for the origin of our hurricane or earthquake wave within this circle on November 10, rather than on the coast of Japan on November 9. In the southern quadrant of this region, namely, between the Sandwich Islands and the coast of Mexico, hurricanes of considerable violence occasionally occur, not to mention the ocean waves started by the earthquakes in the Sandwich Islands.

The weather map of November 11 shows a high area central over the Rocky Mountains, and a configuration of isobars such as would harmonize with the location of a storm center at about 30° N., 125° W. Vessels lying between this center and the Mexican coast would experience southerly winds, and as the storms move toward the northwest until they reach the thirtieth parallel, therefore vessels bound for San Francisco would gradually remove from the center, although still feeling the influence of the favorable winds.

A most important contribution to our knowledge of this class of storms (to which the La Paz hurricane also belongs) was published in the second volume of the narrative of the U. S. Expedition to Japan by Commodore Perry, and an abstract dated September 6, 1856, was published after the death of the author in the American Journal of Science and Art for July, 1857 (2), XXIV, pp. 21–38. This was the last work of W. C. Redfield, the pioneer in the study of the movements of hurricanes. It is entitled, On the Cyclones or Typhoons of the North Pacific Ocean, with a chart showing their courses of progression.

In the latter part of this memoir, which is dated December 26, 1856, Redfield gives the tracks of thirteen hurricanes which passed from about N. 12° between W. 95° and W. 115°, northwestward parallel to the coast of Mexico and Lower California during the season June–October, and in the years 1847–1855. Two other tracks are also given of storms that in attempting to recurve in about N. 20° ran into the Mexican highlands and were more or less modified thereby. Farther to the westward and apparently entirely across the Pacific Ocean, similar whirlwind storms frequently arise. These all move northwestward at first, and if they have not already died away, recurve at about N. 30°, and then move northeastward. As we go farther west these hurricanes are longer lived. The briefest are those that begin on the Mexican coast, but the longest lived are those that begin in the neighborhood of the Caroline Islands and move slowly to the west-northwest, until they recurve before striking Japan. These latter hurricanes may last from five to fifteen days before recurving, and nearly as much longer after doing so. The number of incipient cyclones, typhoons, or hurricanes is apparently quite large and uniformly distributed in a zone across the breadth of the Pacific between N. 5° and 15°, but the proportion of those that die out before becoming important hurricanes appears to increase as we approach the Mexican coast. A similar law is observed in the Atlantic Ocean and it must depend, at least in part, on the fact that the development and recurving of a hurricane is favored by the presence and underflow of cold, dry air on its northwestern side. The reason why so many should die away before recurving, especially in the region between the Sandwich Islands and America, seems to be that the underflow from the northwest consists of air that is both moist and warm, and therefore does not favor the formation of cloud and rain. If the waves recorded at Sausalito came from a hurricane of this class it must have been one of the rare cases of a storm moving northwestward near the Sandwich Islands and recurving to strike the coast of Alaska. The storms that occur very near the west coast of Mexico, as in the La Paz hurricane, are described in the following quotation from the Pilot Chart of the North Pacific Ocean for the month of March, 1896:

> The months of September and October, or the period during which the wet season on the coast of Lower California and Mexico is supplanted by the dry season, are noted in those regions for the occurrence of local storms of great violence, known by the name of "El Cordonazo de San Francisco," or the "Whip of St. Francis." These storms develop rapidly and are especially dangerous to vessels lying at anchor in open harbors and roadsteads. In the harbor of Mazatlan, September 20, 1888, the German bark *Parnass* was blown from her moorings and suffered serious damage.
>
> The approach of one of these storms is announced by a heavy southerly swell, a distinct rise of temperature, and light rains, which later become a torrential downpour. The fall of the barometer is at first slight, but afterward extremely rapid, a case being on record of a fall of six-tenths of an inch in forty minutes. The wind, setting in from the northeast with a force of 7 or 8, shifts later to the southeast and southwest, increasing in force to 10 or 11. The duration of the height of the storm varies from two to eight hours; its extent is ordinarily small. In the case of the *Parnass*, cited above, winds of ordinary force only were noted at places in the immediate neighborhood of Mazatlan,

and the captain of a steamer which reached that port September 21 reported a fresh southwest wind and a steady barometer during the hours at which the *Parnass*, not more than 50 miles distant, was battling with the full force of the hurricane.

Trustworthy reports of these storms are rare, and for this reason it is impossible to draw definite conclusions as to the direction and velocity of motion of the storm center. No reports of their occurrence south of the fifteenth parallel have thus far been received, although Captain Sewall, of the American ship *Paul Revere*, described an encounter with a storm of a similar nature, August 8, 1888, in N. 15°, W. 116°, the storm beginning on the evening of August 7, with the wind from the southeast and a heavy swell from southwest. In the vicinity of the mouth of the Gulf of California the path of the storm is, in general, northerly, following the line of the coast at some distance to seaward.

SUNSHINE.

The occurrence of 100 per cent in the column of duration of sunshine during the first morning hour often strikes the eye by contrast with the rare occurrence of the same high percentage at other hours of the day. This was especially the case in Table IV for October, 1895. As a rule, neither haze, fog, pallium, nor cirrus prevails in the dry American climates, but the principal cloud is the cumulus of midday. The early mornings at or before sunrise are cloudless, but as soon as the surface ground is heated by the sun and the topsy-turvy movements of the daytime begin there begins a steadily increasing amount of cloudiness. It may thus happen, for instance, that if the total duration of sunshine before 6 a. m. is only a few minutes at any station, all of it will be clear sky, whereas if the sunshine had lasted for nearly the whole hour, as it does between six and seven, then the percentage would have dropped lower.

DROUGHT AND AGRICULTURE.

The recent long-continued drought has stimulated the consideration of the question whether there is any permanent change in the quantity of water held in the lakes, both large and small, that cover our so-called Lake Region. It is stated with some show of credibility that during the past ten years there has been a very appreciable drying up of the smaller lakes in Minnesota, and that cultivated fields now occupy the rich lake bottoms that were formerly covered with from 10 to 20 feet of water. The St. Paul Pioneer Press publishes letters from a large number of correspondents representing the whole area of the State, showing that the larger lakes have diminished in volume and the smaller ones have often dried up entirely. A similar story comes from South Dakota. The average rainfall of the past ten years may have been slightly below the normal in these States, but not to a sufficient extent to justify us in attributing this change in the lakes to any great meteorological or climatological change. The fundamental reason for the drying up of the lakes is to be found in the cultivation of the soil and the artificial changes in the drainage. Every acre of virgin soil that is plowed up and cultivated begins to evaporate into the air the moisture that it formerly conserved. Similarly every new drain that is dug helps the water that formerly stayed in the soil to flow off into the rivers. The progress of agriculture begins by an effort to drain the rich lowlands that are usually too wet and ends by the necessity of artificially watering both the dry uplands as well as the warm lowlands. In other words, we begin by evaporating and draining off the water that we eventually wish we could get back again. Successful agriculture involves a steady progress toward the need of more water and the wisest way of using it, but the atmosphere presents an irregular succession of dry years and wet years, and agricultural methods must vary to suit the seasons. In the words of the Pioneer Press:

> Of the seven thousand lakes that dotted Minnesota in 1885 perhaps a third of them will permanently disappear as a result of the cultivation of the soil, the remainder will fluctuate in volume with the average rainfall, shrinking materially during successive dry seasons and reappearing in all their ancient beauty when the rain comes back to fill their empty bowls.

The above considerations emphasize what we have often said about the importance of long-range predictions as to the character of the coming seasons. The same idea is emphasized in the following quotation from the Sioux City Journal:

> What really is needed is a better understanding of the conditions that bring about our seasons—our periods of prolonged drought and our periods of continuous wet weather. We want meteorology made plainer, to the end that farmers may be better prepared for meeting unfavorable conditions. We want a better understanding of causes and effects, and then a better understanding of the way to take care of all the moisture we have or to get rid of what moisture we do not want. It has been demonstrated that a dry season is good for crops, for the season just closed was a good crop season. The science of agriculture is one that will repay careful study. It is worthy of the best thought of the day, and meteorology ought to supplement agriculture to the great benefit of the latter.

CHINOOK IN MONTANA.

According to R. M. Crawford in the Monthly meteorological summary of the Montana Weather Service the Observer, C. L. Herzog, at Great Falls in that State (N. 47° 28′, W. 111° 20′) states that—

> A peculiar phenomenon was closely observed there on the 16th inst. A cold-wave signal having been ordered for that date, the weather at time of receipt of order was very warm and pleasant, and the observer decided to pay more than ordinary attention to the expected change. About 3.30 p. m. the wind which had been blowing gently from the north, veering at times to the northeast, with a velocity of about 9 miles an hour, stiffened quickly and coming directly from the north lowered the temperature 6° in less than five minutes. The indications were that the temperature would fall much lower, but suddenly dark vaporous looking clouds appeared in the extreme southwest, with them simultaneously came a strong gale from the same quarter, blowing at the rate of at least 40 miles an hour. The southwest gale seemed to meet the wind coming in from the north and drove it in a whirl directly toward the northeast across the prairie in a funnel-shaped cone, plainly perceptible for a long distance by the dust gathered. The temperature quickly rose to 58°, the maximum recorded for this date, and the chinook had mastered the cold wave.

[NOTE.—Great Falls is on the Missouri River about 30 miles above Fort Benton, and 60 miles in a straight line, or 150 miles by the river, northeast of Helena. To the north and west are the elevated prairie lands, famous grazing pasture and the last retreat of the almost extinct bison. To the south and west the hills rapidly increase and become the Rocky Mountains. The contour line of 5,000 feet elevation lies about 20 miles to the south, but about 60 miles to the west. Great Falls itself is on the 3,000 foot contour line which crosses the Missouri at this place and extends down the river valley, and but a short distance from it, for 200 miles. On the 15th and 16th an area of high pressure, 30.6, covered Oregon and northern California and extended southeastward into Utah, while low pressure prevailed in Alberta. The cold north and northwest winds on the southwest side of the low were probably felt not only in Alberta but southward and up to an altitude of 3,000 feet. But any air that was pushed into the low pressure from the high area in Oregon and Idaho must necessarily descend through the lowest gap in the Rocky Mountains, which is about 50 miles southwest of Great Falls, and therefore from an altitude of at least 6,000 feet. Through this, and similar gaps farther northwest which are not so low, a descending current always flows over western Montana when the general distribution of pressure is as above described, and warm chinooks extend down to some level such as that of 3,000 feet. There the mixture with the cold northerly winds from Alberta and Saskatchewan begins, and sometimes for several days the border line between warm and cold sways to and fro. Observers in this region have an opportunity to observe several interesting phenomena such as the mixture of the two winds and the character of the clouds formed thereby, or the remarkable connection between temperature and pressure. At one time rising pressure means warmer

weather, at other times colder weather. If each observer will record the time at which the winds and clouds change direction, and will also record either the temperatures or the fact of changes from cold to warm, he will enable the student of this matter to draw systems of lines showing the front of the chinook and the opposing front of the cold wave at any time. It is believed that between these two fronts there is an intermediate belt of neutral ground that may be 5 or 50 miles wide, the location of which is important in regulating the display of cold wave signals. The chinook appears sometimes to pass overhead over a broad strip of country and descend some distance beyond, but is eventually pushed back to the mountains. Thus in November, 1894, the chinook began at Havre (Fort Assiniboine), 60 miles northeast of Fort Benton, on the 13th at 11 p. m., but at Helena, southwest of Fort Benton, on the 14th, at 9 a. m. In this case the whole northwestern corner of Montana was first filled by the warm southwest chinook, which was then pushed southward by underflowing cold northwest winds from Alberta.

The study of the exact extent and progress of the chinook is hindered by the fact that many of our voluntary observers fail to make a complete record of the phenomena that they observe, so that only fragments of knowledge come to our hands, while the observer knows by experience many important local details. The whole subject can best be studied by plotting upon a series of contour maps the detailed records that we hope to receive from our observers in that section.]

CONTRIBUTIONS TO THE WEATHER REVIEW.

In order that all the observers and officials of the Weather Bureau may profit by the numerous interesting observations that are frequently made in distant parts of the country, the Chief of the Bureau has authorized the issue of a circular letter, No. 17, of 1895, from which the following extract is made:

By direction of the Chief of Bureau, I am requested to say that any short article that you may desire to offer for publication in the MONTHLY WEATHER REVIEW will be taken into favorable consideration. Papers that are too technical for publication in the daily newspapers or popular journals, or in the monthly bulletins of the State Weather Services, or those that relate to matters of general rather than local interest, are appropriate to the MONTHLY WEATHER REVIEW.

If the article should not be accepted for the REVIEW, it will be returned to you, with such suggestions, relative to its publication, as may seem proper to the Chief.

METEOROLOGICAL TABLES.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

Table I gives, for about 130 Weather Bureau stations making two observations daily and for about 20 others making only the 8 p. m. observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation.

Table II gives, for about 2,400 stations occupied by voluntary observers, the extreme maximum and minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station; the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (. . . .).

Table III gives, for about 30 Canadian stations, the mean pressure, mean temperature, total precipitation, prevailing wind, and the respective departures from normal values. Reports from Newfoundland and Bermuda are included in this table for convenience of tabulation.

Table IV gives, for 29 stations, the mean hourly temperatures deduced from thermographs of the pattern described and figured in the Report of the Chief of the Weather Bureau, 1891–'92, p. 29.

Table V gives, for 28 stations, the mean hourly pressures as automatically registered by Richard barographs, except for Washington, D. C., where Foreman's barograph is in use. Both instruments are described in the Report of the Chief of the Weather Bureau, 1891–'92, pp. 26 and 30.

Table VI gives, for 136 stations, the arithmetical means of the hourly movements of the wind ending with the respective hours, as registered automatically by the Robinson anemometer, in conjunction with an electrical recording mechanism, described and illustrated in the Report of the Chief of the Weather Bureau, 1891–'92, p. 19.

Table VII gives the danger points, the highest, lowest, and mean stages of water in the rivers at cities and towns on the principal rivers; also the distance of the station from the river mouth along the river channel.

Table VIII gives the maximum, minimum, and mean readings of the wet-bulb thermometer for 135 stations, as determined by observations of the whirled psychrometer at 8 a. m. and 8 p. m., daily.

The difference between mean local time and seventy-fifth meridian time is also given in the table.

Table IX gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in any geographical division one may obtain the average resultant direction for that division.

Table X gives the total number of stations in each State from which meteorological reports of any kind have been received, and the number of such stations reporting thunderstorms (T) and auroras (A) on each day of the current month.

Table XI gives, for 38 stations, the percentages of hourly sunshine as derived from the automatic records made by two essentially different types of instruments, designated, respectively, the thermometric recorder and the photographic recorder. The kind of instrument used at each station is indicated in the table by the letter T or P in the column following the name of the station.

Table XII gives the records of hourly precipitation as reported by stations equipped with automatic gauges, of which 37 are known as float gauges and 7 as weighing rain and snow gauges.

Table XIII gives the record of excessive precipitation at all stations from which reports are received.

Table XIV gives a record of the heaviest rainfalls for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering rain gauges.

Additional information concerning the tables will be found in the January, 1895, REVIEW.

TABLE I.—*Climatological data for Weather Bureau Stations, November, 1895.*

Stations.	Elevation above sea-level, feet.	Length of record, years.	Pressure in inches. Mean pressure, 8 a. m. and 8 p. m. ÷ 2.	Mean reduced.	Departure from normal.	Temperature of the air, in degrees Fahrenheit. Mean max. and min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Humidity and precipitation. Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with .01, or more.	Wind. Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Monthly temperature data since opening station. Absolute maximum.	Year.	Absolute minimum.	Year.
New England.						43.7	+ 2.1										5.83	+ 1.3														
Eastport	76	23	30.05	30.14	+ .17	39.8	+ 2.4	61	8	46	14	22	34	29	33	78	6.41	+ 1.8	14	8,733	sw.	46	s.	1	3	13	14	7.0	64	1888	—13	1875
Portland, Me	103	34	30.02	30.13	+ .12	40.0	+ 2.2	69	8	47	14	22	33	30	34	83	7.18	+ 3.0	17	4,939	sw.	38	s.	26	8	10	12	6.2	69	1895	— 6	1875
Northfield	872	9	29.20	30.17	+ .13	34.8	+ 1.8	66	7	44	0	22	26	37	27	78	5.68	+ 2.6	15	6,046	sw.	38	s.	26	8	8	14	6.7	70	1888	—14	1891
Boston	135	26	30.03	30.17	+ .14	45.4	+ 2.7	73	7	52	21	22	38	29	39	83	8.07	+ 3.4	15	7,923	w.	41	sw.	26	8	5	17	6.6	75	1876	— 2	1875
Nantucket	14	10	30.16	30.17	+ .10	47.2	+ 2.6	66	8	52	26	22	42	18	42	84	4.86	+ 1.4	17	8,681	se.	42	e.	2	8	6	16	6.8	66	1895	19	1894
Woods Hole	.....	18	.....	.....	.....	46.2	+ 1.9	62	26	51	25	22	42	24	.....	.....	4.61	— 0.5	13	10,562	s.	52	sw.	21	12	3	15	5.8	67	1881	5	1875
Vineyard Haven	.....	10	.....	.....	.....	48.8	+ 3.0	66	19	56	25	22	42	25	.....	.....	5.77	+ 2.5	14	.....	nw.	....	.....	...	8	6	16	....	72	1893	20	1887
Block Island	37	16	30.15	30.18	+ .12	46.8	+ 1.1	65	8	52	24	22	42	26	42	84	5.81	+ 1.9	14	11,958	sw.	54	ne.	2	3	13	14	7.1	70	1881	19	1890
Narragansett Pier	.....	14	.....	.....	.....	44.8	+ 1.8	70	8	53	16	22	37	29	.....	.....	5.09	+ 1.2	15	.....	w.	....	.....	...	12	1	17	....	72	1892	11	1891
New Haven	107	23	30.05	30.17	+ .10	43.6	+ 1.7	65	8	51	19	22	36	27	37	82	4.84	+ 0.9	13	6,409	n.	43	w.	21	11	4	15	5.8	72	1882	2	1875
Mid. Atlan. States.						47.1	+ 0.3										2.89	— 0.4														
Albany	85	22	30.09	30.19	+ .12	40.8	— 0.2	70	8	48	17	22	33	34	35	84	4.78	+ 1.7	13	4,804	s.	34	se.	26	10	3	17	6.2	70	*	—10	1875
New York	314	26	29.84	30.18	+ .10	46.0	+ 0.3	72	9	52	24	22	39	26	40	84	3.58	— 0.1	12	4,432	w.	42	w.	26	9	10	11	5.6	74	1882	7	1875
Harrisburg	377	8	29.79	30.21	+ .07	44.0	+ 1.6	75	9	51	24	22	37	27	38	82	1.72	— 1.3	12	4,566	e.	31	w.	30	9	10	11	5.5	75	1895	14	1891
Philadelphia	117	25	30.07	30.19	+ .08	46.8	+ 1.7	74	9	54	26	22	40	25	39	78	2.32	— 0.9	12	7,195	nw.	30	n.	30	11	6	13	5.7	77	1876	8	1875
New Brunswick	.....	9	.....	.....	.....	45.4	+ 3.2	74	8	55	19	22	36	33	.....	.....	3.93	+ 0.3	14	.....	sw.	....	.....	...	3	15	12	....	74	1895	10	1891
Baltimore	142	25	30.04	30.19	+ .07	47.1	0.0	77	9	54	26	21	40	27	38	74	1.86	— 1.3	10	5,373	n.	28	nw.	26	12	8	10	5.1	78	1879	15	1880
Washington	112	26	30.09	30.21	+ .08	46.4	0.0	77	9	55	24	*	38	31	38	81	1.36	— 1.6	12	4,524	n.	28	nw.	26	14	6	10	4.8	80	1879	12	1880
Cape Henry	.....	22	.....	.....	.....	52.6	+ 0.5	79	9	59	26	21	46	30	.....	.....	4.07	+ 0.2	13	.....	n.	....	.....	...	9	8	13	....	81	*	24	1880
Lynchburg	685	25	29.46	30.21	+ .07	48.8	+ 0.6	76	9	58	24	29	39	33	39	79	1.93	— 1.2	8	2,763	ne.	26	nw.	30	12	11	7	4.5	81	1890	13	1880
Norfolk	57	25	30.12	30.19	+ .07	53.1	+ 0.9	80	9	60	28	21	46	25	46	83	3.41	+ 0.3	12	6,206	ne.	40	nw.	30	11	7	12	5.9	80	*	20	1872
S. Atlantic States.						55.6	— 0.3										3.53	+ 0.4														
Charlotte	773	18	29.35	30.19	+ .05	51.0	— 0.4	76	9	60	25	21	42	26	40	74	2.39	— 0.9	8	5,508	ne.	32	sw.	26	11	10	9	5.1	80	1879	18	1880
Hatteras	11	15	30.15	30.16	+ .05	57.4	+ 1.2	77	7	62	37	21	53	18	54	87	7.78	+ 2.6	12	11,887	ne.	54	n.	12	6	10	14	6.6	79	1882	28	*
Kittyhawk	9	21	30.13	30.14	+ .06	54.6	+ 0.9	77	9	60	32	21	50	24	50	86	5.88	+ 1.8	16	13,197	ne.	59	n.	12	9	10	11	5.5	80	1888	23	1879
Raleigh	388	9	29.78	30.21	+ .04	51.2	+ 1.4	78	9	60	26	21	42	30	42	78	2.84	+ 0.7	10	5,116	n.	32	nw.	20	11	8	11	5.4	80	1889	17	1891
Wilmington	78	25	30.09	30.18	+ .05	56.0	— 0.2	80	10	64	31	21	48	30	49	85	3.38	+ 0.8	13	6,424	ne.	38	nw.	20	11	8	11	5.2	83	*	20	1872
Charleston	52	25	30.14	30.19	+ .06	58.1	— 0.8	80	9	65	37	21	52	19	51	84	2.44	— 0.8	13	6,171	n.	24	nw.	20	11	9	10	5.3	82	*	28	*
Columbia	.....	9	.....	.....	.....	54.0	— 0.9	83	10	65	26	21	43	37	.....	.....	1.71	— 0.8	8	.....	ne.	....	.....	...	10	9	11	....	83	1895	21	1892
Augusta	180	24	29.99	30.19	+ .06	54.4	— 1.0	82	9	65	31	27	44	34	44	78	2.01	— 1.3	7	4,036	n.	36	w.	26	15	6	9	4.5	85	1885	23	1892
Savannah	98	25	30.07	30.18	+ .03	58.1	— 1.1	82	9	66	34	27	50	26	49	82	3.74	+ 1.6	9	6,100	n.	30	nw.	20	12	6	12	5.0	83	1889	22	1872
Jacksonville	43	25	30.10	30.15	+ .03	61.0	— 2.2	84	9	69	35	27	53	28	54	84	3.12	+ 0.5	13	5,244	n.	25	n.	6	10	8	12	5.9	86	1889	26	1887
Florida Peninsula.						71.3	+ 0.3										2.27	— 0.4														
Jupiter	28	8	30.05	30.08	— .02	72.0	— 0.2	83	11	78	48	21	66	22	66	82	4.80	+ 1.4	12	7,522	n.	30	nw.	20	6	14	10	5.8	87	1889	43	1888
Key West	22	26	30.05	30.07	+ .01	74.8	+ 0.6	85	10	78	63	21	71	14	68	81	0.24	— 2.4	6	8,162	ne.	36	n.	20	12	12	6	4.7	91	1876	52	1873
Tampa	36	6	30.09	30.13	.....	67.0	+ 0.4	84	8	76	42	21	58	28	58	81	1.78	— 0.1	10	4,542	n.	23	nw.	20	10	16	4	4.6	87	1892	34	1891
East Gulf States.						57.4	— 0.7										1.23	— 2.8														
Atlanta	1,131	18	28.98	30.19	+ .02	52.4	+ 0.6	77	9	61	26	27	44	27	45	84	1.04	— 3.0	7	7,381	nw.	36	nw.	20	17	7	6	4.2	82	1890	16	1887
Pensacola	56	17	30.11	30.17	+ .04	58.7	— 1.7	76	9	66	33	27	51	26	49	74	1.27	— 3.1	5	6,700	ne.	32	nw.	20	12	8	10	4.8	81	*	28	*
Mobile	57	25	30.13	30.20	+ .06	57.7	— 1.0	75	9	66	31	27	49	30	49	82	0.60	— 3.5	5	5,237	n.	30	nw.	19	11	7	12	5.3	83	1888	25	1887
Montgomery	221	24	29.94	30.18	+ .02	55.8	— 0.9	79	9	66	27	27	46	37	43	68	0.87	— 2.8	5	4,506	ne.	28	nw.	19	15	6	9	4.5	83	*	21	*
Meridian	358	7	29.79	30.18	.00	54.6	+ 1.2	78	8	65	25	27	44	38	44	78	1.97	— 1.4	6	4,000	ne.	25	n.	19	11	8	11	5.2	82	1891	18	1894
Vicksburg	254	25	29.88	30.15	— .01	56.9	— 0.5	78	5	67	31	27	47	31	44	68	2.74	— 2.2	6	5,330	se.	32	sw.	25	15	6	9	4.5	85	*	22	1891
New Orleans	54	25	30.12	30.18	+ .06	60.5	— 1.2	81	8	68	37	27	53	27	50	77	0.69	— 3.8	4	6,478	ne.	36	n.	19	14	10	6	4.4	85	1888	30	1891
Port Eads	.....	10	.....	.....	.....	62.4	— 2.4	76	*	68	45	26	57	19	.....	.....	0.64	— 2.4	4	.....	n.	....	.....	...	6	11	13	....	.....	.....	.....	.....
West Gulf States.						55.4	— 2.4										4.61	+ 0.5														
Shreveport	249	25	29.88	30.15	+ .01	54.3	— 2.2	80	18	64	29	27	45	33	44	78	6.06	+ 1.2	8	5,107	se.	32	nw.	25	10	4	16	5.7	86	1882	18	1880
Fort Smith	481	14	29.60	30.13	+ .01	48.3	— 3.4	79	18	59	24	26	37	45	38	73	3.25	— 0.4	9	4,728	e.	26	n.	19	14	4	12	5.2	86	1882	17	1887
Little Rock	302	17	29.83	30.16	+ .02	50.2	— 2.5	76	18	59	28	27	41	31	41	78	5.26	— 0.3	7	4,846	n.	37	nw.	19	12	5	13	5.7	83	1882	10	1880
Corpus Christi	20	9	30.12	30.14	+ .02	61.6	— 2.1	80	13	68	38	26	55	30	56	85	4.14	+ 1.0	12	7,058	se.	28	nw.	9	7	5	18	6.6	86	*	33	1887
Galveston	42	25	30.12	30.16	+ .04	61.0	— 2.7	76	8	66	37	26	56	17	54	79	5.95	+ 1.8	12	8,243	e.	45	n.	13	13	4	13	5.4	85	1886	29	1880
Palestine	510	14	29.60	30.16	+ .01	54.7	— 2.7	79	18	64	29	26	46	32	44	78	4.23	— 0.4	7	4,583	n.	26	n.	19	9	5	16	6.2	87	1888	20	1887
San Antonio	704	17	29.40	30.16	+ .03	58.0	— 1.0	80	17	68	32	26	48	35	45	72	3.38	+ 1.3	13	5,499	n.	36	n.	19	8	8	14	6.4	88	*	21	1890
Ohio Val. & Tenn.						46.8	— 3.3										3.74	0.0														
Chattanooga	762	17	29.30	30.21	+ .05	51.5	+ 0.3	77	6	61	26	28	42	34	40	71	1.71	— 2.6	6	4,832	s.	36	w.	26	10	8	12	5.6	79	1890	16	1887
Knoxville	980	25	29.14	30.21	+ .06	49.4	+ 1.0	76	6	60	26	28	39	33	38	73	1.90	— 2.2	9	3,496	sw.	36	sw.	25	14	7	9	4.7	80	1881	12	1873
Memphis	399	25	29.73	30.17	+ .03	51.5	— 0.9	74	5	60	27	27	44	29	41	74	5.54	+ 0.7	9	7,253	se.	44	sw.	25	11	8	11	5.4	82	1879	16	*
Nashville	545	25	29.58	30.17	+ .04	49.3	— 0.9	76	7	58	22	27	40	36	39	72	2.14	— 1.8	6	5,018	se.	44	se.	25	9	7	14	6.3	81	1882	10	1887
Lexington	989	13	29.08	30.16	+ .05	45.0	— 1.1	78	7	54	20	27	36	29	35	73	2.52	— 1.4	9	9,007	s.	62	s.	26	6	5	19	7.0	78	1895	6	1887
Louisville	525	25	29.58	30.17	+ .04	45.7	— 2.4	79	6	54	22	27	37	37	35	72	7.01	+ 2.9	13	5,693	se.	57	sw.	26	7	5	18	7.1	79	1895	4	1872
Indianapolis	766	25	29.31	30.16	+ .05	42.3	— 0.1	73	7	50	17	27	35	28	33	73	5.81	+ 2.0	14	4,588	se.	33	sw.	26	6	7	17	6.9	76	1888	— 5	1890
Cincinnati	628	25	29.49	30.18	+ .06	44.2	— 1.7	78	7	53	22	27	36	34	34	71	4.66	+ 1.3	11	5,170	se.	48	sw.	26	8	8	14	6.3	78	1895	5	1880
Columbus	824	18	29.27	30.18	+ .06	42.4	0.0	77	7	51	18	21	34	33	35	81	5.32	+ 2.1	13	4,858	se.	38	sw.	26	4	12	14	6.9	77	1895	— 5	1880
Pittsburg	842	25	29.26	30.18	+ .07	45.4	+ 1.0	74	8	54	22	21	37	36	38	81	2.24	— 0.4	14	4,589	se.	30	w.	26	7	11	12	6.2	79	1876	4	1880
Parkersburg	638	8	29.49	30.20	+ .04	45.6	+ 1.5	78	7	56	24	*	35	38	36	79	2.26	— 0.9	13	3,630	se.	36	sw.	26	7	11	12	6.4	78	1895	15	*
Lower Lake Region.						46.1	— 0.6										4.38	+ 1.2														
Buffalo	690	25	29.37	30.13	+ .09	40.2	+ 0.3	68	7	46	16	21	35	28	30	69	4.34	+ 0.7	14	8,418	sw.	68	w.	26	2	12	16	7.4	70	*	2	1875
Oswego	335	26	29.76	30.14	+ .09	39.8	+ 0.9	67	6	46	16	22	33	31	32	77	4.44	+ 1.1	13	8,294	s.	39	s.	26	4	5	21	7.6	71	*	— 1	1875
Rochester	523	26	29.56	30.14	+ .09	40.1	+ 1.2	71	7	47	16	22	34	33	31	76	3.39	+ 0.5	13	5,501	sw.	37	sw.	26	7	10	13	6.4	73	1888	1	1875
Erie	714	23	29.35	30.14	+ .09	41.4	+ 0.8	70	7	48	17	22	35	32	33	76	4.37	— 0.1	15	8,301	s.	54	sw.	26	4	8	18	7.2	74	1888	6	1880
Cleveland	740	26	29.33	30.15	+ .07	41.4	+ 0.2	73	7	49	20	21	34	34	33	78	4.52	+ 1.7	13	10,066	se.	73	s.	26	5	9	16	6.8	74	1888	0	1880
Sandusky	629	19	29.44	30.14	+ .07	40.8	— 1.4	75	7	47	14	21	34	27	32	75	4.73	+ 1.8	12	6,289	s.	41	s.	26	4	5	21	7.5	76	1888	0	1880
Toledo	674	25	29.40	30.15	+ .09	39.0	— 2.2	73	7	46	15	21	32	32	31	80	5.08	+ 2.2	15	6,889	sw.	60	sw.	26	7	8	15	6.7	74	1888	5	1880
Detroit	724	25	29.33	30.13	+ .07	37.8	— 3.3	68	7	44	11	21	32	29	30	80	4.19	+ 1.7	13	7,876	sw.	76	sw.	26	10	5	15	6.0	70	1888	0	1880
Upper Lake Region.						33.4	— 1.5										2.85	— 0.4														
Alpena	609	24	29.41	30.09	+ .07	33.0	— 1.4	62	5	38	8	21	28	22	27	80	2.15	— 0.8	13	6,613	sw.	30	n.	19	3	13	14	7.1	67	*	— 4	1880
Grand Haven	628	25	29.40	30.10	+ .07	36.4	— 2.5	65	5	42	14	27	30	30	30	82	3.47	— 0.5	15	7,685	se.	35	sw.	27	2	10	18	7.5	72	1888	0	1880
Marquette	734	25	29.24	30.06	+ .05	31.6	— 1.6	66	5	38	8	27	26	34	26	81	2.83	+ 0.4	20	7,678	s.	34	se.	5	3	7	20	7.6	69	1886	— 9	1875
Port Huron	639	22	29.42	30.14	+ .09	37.2	— 0.9	69	6	44	9	21	30	34	28	75	3.91	+ 1.2	14	8,632	s.	58	sw.	26	8	12	10	5.6	69	1895	— 6	1880
Sault Ste. Marie	642	8	29.36	30.08	+ .10	29.9	— 1.3	60	5	36	— 1	21	24	25	24	82	1.51	— 1.0	14	5,694	se.	25	nw.	24	4	8	18	7.4	62	1893	— 7	1894
Chicago	824	25	29.21	30.12	+ .06	36.5	— 2.2	67	5	42	8	27	31	27	28	72	5.60	+ 3.0	12	13,904	s.	53	s.	27	5	11	14	6.9	75	1888	— 2	1872
Milwaukee	673	26	29.37	30.12	+ .07	34.5	— 1.7	66	4	41	7	27	28	29	28	80	2.99	+ 1.0	13	7,637	s.	34	n.	26	8	6	16	6.6	70	*	—14	1875
Green Bay	617	10	29.42	30.12	+ .05	32.8	+ 0.2	68	5	40	5	27	26	26	24	71	1.50	— 0.9	10	6,482	s.	32	nw.	19	4	12	14	7.3	68	1895	—12	1887
Duluth	702	26	29.26	30.06	+ .08	29.0	— 1.8	58	5	35	— 1	26	23	33	22	79	1.65	0.0	11	5,410	sw.	28	nw.	26	7	7	16	6.5	65	1887	—29	1875
North Dakota.						21.2	— 4.2										1.65	+ 1.1														
Moorhead	935	15	29.00	30.08	.00	39.2	— 2.7	64	3	30	—12	22	16	37	19	87	1.88	— 1.0	12	6,637	s.	42	se.	30	5	10	15	6.8	72	1887	—24	1891
St. Vincent	794	16	29.15	30.06	— .02	19.4	— 1.7	48	17	28	—16	20	11	31	16	93	1.21	+ 0.7	9	6,396	nw.	30	s.	5	8	10	12	6.2	69	1887	—30	1887
Bismarck	1,661	22	28.22	30.12	+ .04	32.2	— 0.7	64	1	32	—11	22	13	46	11	68	1.60	+ 1.0	7	5,578	nw.	30	nw.	5	3	12	15	6.9	73	1887	—28	1875
Williston	1,875	17	27.99	30.09	+ .01	20.0	— 7.9	60	1	28	—14	8	12	41	13	74	1.01	+ 1.6	11	6,215	n.	46	n.	5	8	7	15	6.3	68	1887	—29	1887
Upper Miss. Valley.						37.3	— 2.1										2.36	0.2														
Minneapolis	.....	6	.....	.....	.....	31.8	— 0.2	67	3	40	— 2	26	24	31	.....	.....	0.70	0.0	10	.....	nw.	....	.....	...	6	11	13	....	73	1893	—13	1891
St. Paul	850	26	29.14	30.10	+ .04	30.6	— 1.8	67	3	39	— 5	26	22	32	23	77	0.85	— 0.4	10	5,286	se.	25	se.	5	5	13	12	6.1	74	*	—24	1875
La Crosse	720	24	29.31	30.12	+ .06	33.6	— 2.4	70	5	41	5	24	28	28	26	80	1.45	— 0.2	9	5,755	s.	32	s.	3	7	10	13	6.4	72	1893	—21	1875
Davenport	613	24	29.43	30.11	+ .02	36.4	— 2.9	70	4	43	9	26	30	26	28	74	2.50	+ 0.5	10	7,028	nw.	27	se.	3	6	8	16	6.9	78	1888	—10	1891
Des Moines	869	18	29.16	30.14	+ .04	36.4	— 1.6	74	4	44	2	26	28	36	26	70	0.85	— 1.1	9	6,720	n.	30	sw.	5	6	7	17	6.8	75	1888	—10	1891

TABLE I.—*Climatological data for Weather Bureau Stations, November*, 1895—Continued.

Stations.	Elevation above sea-level, feet.	Length of record, years.	Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.								Humidity and precipitation.					Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Monthly temperature data since opening station.			
			Mean pressure, 8 a. m. and 8 p. m. +2.	Mean reduced.	Departure from normal.	Mean max. and min. +2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.				Absolute maximum.	Year.	Absolute minimum	Year.
Up. Miss. Val.—Con						35.9	— 1.1	71	5	43	11	*	29	36			2.12	0.0	10		n.				11	5	14		72	*	—12	1887
Dubuque		23				46.6	— 1.8	71	6	54	24	30	39	31	37	73	5.27	+ 1.0	9	6,000	s.	37	w.	25	9	8	13	6.0	80	1882	7	1872
Keokuk	613	25	29.44	30.12	+ .03	38.6	— 2.7	73	4	46	7	26	31	31	29	72	2.58	+ 0.6	14	6,082	n.	25	s.	3	9	5	16	6.1	79	1888	— 3	1872
Cairo	359	25	29.75	30.14	+ .03	46.6	— 1.8	71	6	54	24	30	39	31	37	73	5.27	+ 1.0	9	6,009	s.	37	w.	25	9	8	13	6.0	80	1882	7	1872
Springfield, Ill.	644	17	29.42	30.13	+ .02	39.6	— 3.6	72	7	47	9	27	32	33	30	75	3.28	+ 0.4	14	7,447	s.	32	nw.	19	7	8	15	6.5	77	*	4	1887
Hannibal	534	....	29.54	30.13	.....	39.6	.....	74	4	47	13	26	32	32	31	78	4.40	.....	15	6,902	s.	36	nw.	19	10	5	15	6.4	....	.....	.....	.....
St. Louis	571	25	29.53	30.16	+ .04	43.2	— 3.0	76	7	50	16	26	36	31	34	74	3.98	+ 1.1	10	8,556	se.	42	nw.	19	7	7	16	6.5	82	1879	5	1872
Missouri Valley.						37.4	— 2.2										1.38	+ 0.2													
Columbia		7				42.6	— 2.2	78	4	53	9	26	32	42	.....	.....	4.19	+ 1.5	13	6,652	se.	41	nw.	19	7	10	13	6.4	80	1890	5	1891
Kansas City	963	8	29.08	30.14	+ .02	41.1	— 2.2	75	4	49	10	26	33	34	32	74	3.05	+ 0.6	7	6,975	s.	38	nw.	19	9	10	11	5.6	79	1891	7	1891
Springfield, Mo	1,324	9	28.69	30.12	+ .01	43.4	— 2.8	70	*	52	16	26	35	36	33	74	3.22	— 0.5	10	8,049	se.	36	nw.	19	10	8	12	5.9	79	*	8	1887
Topeka		9				42.8	— 1.4	77	4	53	11	26	33	36	.....	.....	1.00	— 0.5	7	.....	s.	....	.....	...	7	12	11	....	83	1891	— 5	1887
Omaha	1,123	25	28.89	30.13	— .01	36.8	— 2.2	72	4	45	2	26	29	36	28	77	1.06	— 0.2	5	6,512	n.	36	nw.	19	7	8	15	6.3	80	1887	—14	1887
Sioux City	1,165	7	28.80	30.10	— .02	33.2	— 1.1	67	2	42	— 1	26	24	46	24	75	0.80	+ 0.1	6	8,022	s.	37	s.	5	8	9	13	6.3	74	1890	— 9	1891
Pierre	1,470	20	28.46	30.09	— .02	30.8	— 3.4	72	2	41	2	22	21	41	20	72	0.45	0.0	5	5,014	n.	18	s.	9	13	6.3	80	1891	—27	1887
Huron	1,310	15	28.64	30.11	.00	28.8	— 2.6	69	2	39	— 5	22	18	43	19	75	1.30	+ 0.8	11	8,497	se.	46	sw.	5	5	10	15	6.4	77	1893	—28	1887
Northern Slope.						30.7	— 2.2										0.99	+ 0.5													
Havre	2,477	16	27.34	30.05	— .04	28.1	— 2.7	63	16	37	— 5	22	19	39	20	74	0.47	— 0.2	7	7,049	sw.	40	w.	16	7	8	15	6.5	72	1894	—30	1887
Miles City	2,372	18	27.48	30.07	.....	28.9	— 2.4	65	1	39	— 7	7	19	39	22	77	0.77	+ 0.4	5	4,260	s.	41	nw.	18	9	12	9	5.7	73	1891	—22	1880
Helena	4,108	16	25.85	30.17	+ .03	32.4	— 0.2	61	17	40	1	22	25	35	20	63	0.77	+ 0.3	7	6,040	sw.	45	w.	15	7	8	15	6.6	71	1894	—17	*
Rapid City	3,260	10	26.59	30.09	— .05	31.8	— 4.0	71	2	42	— 2	23	22	39	20	66	1.03	+ 0.7	9	5,796	w.	48	nw.	18	2	14	14	7.0	79	1894	— 6	1893
Cheyenne	6,105	25	23.96	30.17	+ .02	33.4	— 2.0	65	2	43	— 3	23	23	34	16	54	0.63	+ 0.3	8	8,842	nw.	44	nw.	28	6	16	8	5.5	75	1891	—20	1875
Lander	5,377	13	24.63	30.24	+ .04	25.1	— 1.9	66	2	38	—12	24	12	39	14	73	2.30	+ 1.7	5	1,909	sw.	24	ne.	18	9	16	5	4.7	72	1894	—23	1882
North Platte	2,836	22	27.10	30.15	.00	35.2	— 2.1	75	2	48	— 2	26	23	46	23	72	0.96	+ 0.6	5	5,997	w.	43	nw.	18	10	14	6	5.2	81	1887	—25	1887
Middle Slope.						40.2	— 1.4										0.78	0.0													
Denver	5,309	24	24.71	30.16	— .02	37.8	— 2.2	75	2	50	2	23	26	39	13	45	0.27	— 0.4	2	5,791	s.	40	ne.	21	10	17	3	4.7	76	*	—18	1877
Pueblo	4,734	8	25.26	30.14	— .01	38.0	— 2.7	76	1	53	2	26	23	36	14	46	0.32	+ 0.1	5	4,773	nw.	38	ne.	21	14	9	7	4.7	81	1894	1	1889
Concordia	1,410	11	28.58	30.12	— .02	40.5	— 1.2	76	4	50	5	26	31	36	28	69	1.19	— 0.2	5	6,362	s.	35	s.	3	13	8	9	4.7	82	*	—15	1887
Dodge City	2,504	22	27.43	30.11	.00	41.3	— 1.0	75	4	53	10	26	29	44	28	71	0.34	— 0.2	5	7,622	nw.	45	s.	4	17	7	6	3.6	84	1888	—13	1887
Wichita	1,351	8	28.64	30.11	— .02	43.4	— 0.1	74	4	53	14	26	34	38	33	75	1.80	+ 0.8	7	7,646	s.	36	nw.	19	15	3	12	4.7	83	1891	10	*
Oklahoma	1,239	....	28.81	30.16	.....	45.0	.....	77	17	54	13	26	36	34	37	81	5.79	.....	9	7,398	s.	42	n.	19	16	6	8	4.1	86	1891	9	1894
Southern Slope.						.....	.....										.....	.....													
Abilene	1,749	11	28.31	30.18	+ .04	50.4	— 3.3	77	21	60	17	26	41	36	39	75	2.38	— 0.3	11	7,094	n.	34	n.	19	16	4	10	4.3	86	*	13	1887
Amarillo	3,691	....	26.29	30.15	.....	42.2	.....	77	18	54	15	23	30	45	27	66	0.81	.....	8	11,260	sw.	46	sw.	3	15	9	6	3.8	79	1894	15	1895
Southern Plateau.						50.8	— 1.3										0.37	+ 0.3													
El Paso	3,767	18	26.34	30.13	+ .02	50.2	— 1.9	76	4	63	28	26	37	38	31	60	1.05	+ 0.5	5	7,696	nw.	50	sw.	3	17	11	2	2.7	82	1882	11	1880
Santa Fe	6,998	22	23.37	30.17	+ .04	35.0	— 3.1	57	21	44	9	26	26	36	30	60	1.18	+ 0.3	11	4,621	ne.	42	sw.	4	20	2	8	3.5	77	1878	—11	1880
Phœnix	1,106	....	26.85	30.04	.....	57.0	— 0.6	83	19	70	34	27	45	38	43	68	0.89	+ 0.4	6	3,291	se.	24	se.	22	21	4	5	3.0	....	.....	.....	.....
Yuma	141	21	29.85	30.00	— .02	60.8	— 1.9	85	19	74	34	25	48	35	37	47	0.37	0.0	2	4,896	n.	34	se.	11	23	7	0	1.4	92	*	31	1880
Independence	3,884	....	26.07	30.07	.....	48.3	.....	80	18	61	24	23	36	37	19	38	0.67	.....	1	6,463	nw.	50	n.	21	15	8	7	4.0	....	.....	.....	.....
Middle Plateau.						37.3	— 2.3										1.21	— 0.2													
Carson City	4,730	8	25.38	30.21	.....	39.6	— 2.1	70	30	54	14	24	25	47	19	45	0.86	— 1.1	5	.....	nw.	....	.....	...	30	3	7	3.5	72	*	8	1893
Winnemucca	4,340	17	25.74	30.22	+ .02	34.6	— 2.6	64	18	49	3	25	30	48	15	50	0.33	— 0.4	6	6,565	ne.	44	nw.	21	13	13	4	4.2	73	1891	— 9	1880
Salt Lake City	4,345	22	25.70	30.22	— .01	37.8	— 2.2	66	2	46	20	*	29	32	28	72	2.44	+ 1.0	9	3,512	se.	30	s.	3	8	6	16	6.6	72	1891	3	1880
Northern Plateau.						35.8	— 1.1										1.16	— 0.1													
Baker City	3,430	7	26.52	30.14	.00	34.2	— 2.9	56	1	43	9	6	25	39	22	66	0.33	— 0.6	4	4,011	s.	33	nw.	22	9	12	9	5.2	....	.....	.....	.....
Idaho Falls	4,742	6	25.28	30.25	.....	28.4	— 1.9	56	2	37	2	7	30	31	21	77	0.70	— 0.2	9	4,457	s.	31	nw.	22	8	9	13	6.1	61	1894	1	1893
Spokane	1,930	15	28.07	30.17	+ .03	37.0	— 0.4	56	19	44	11	23	30	27	29	77	1.96	+ 0.5	9	3,454	sw.	24	ne.	21	7	8	15	6.4	69	1891	3	1881
Walla Walla	1,018	10	29.06	30.17	— .02	43.4	+ 0.9	69	17	51	21	23	36	32	35	42	1.67	0.0	7	4,087	s.	37	s.	28	12	11	7	4.8	76	1891	13	1887
N. Pac. Coast Reg.						44.8	— 1.5										6.53	— 1.1													
East Clallam						44.0	.....	63	11	49	28	*	39	18	.....	.....	7.50	.....	19	.....	e.	....	.....	...	8	2	20	....	.....	.....	.....	.....
Fort Canby	179	13	29.33	30.13	+ .08	46.0	— 1.7	57	15	50	36	23	42	14	43	89	7.70	+ 1.2	16	9,129	n.	78	se.	28	6	7	17	7.0	72	1890	33	1887
Neah Bay	....	11	....	....	....	46.0	— 1.0	62	15	53	30	23	40	25	.....	.....	11.55	— 1.4	17	.....	e.	....	.....	...	6	1	23	....	62	1895	25	1887
Port Angeles	29	11	30.07	30.10	+ .10	43.6	+ 1.2	60	15	49	29	23	38	18	39	86	3.04	— 0.5	15	3,229	s.	24	w.	20	4	13	13	6.7	61	1887	24	*
Port Crescent	....	....	....	....	....	41.6	.....	64	15	49	24	*	34	27	.....	.....	3.76	.....	15	.....	e.	....	.....	...	6	10	14	....	.....	.....	.....	.....
Pysht	....	....	....	....	....	42.0	.....	60	15	48	23	27	36	24	.....	.....	5.86	.....	21	.....	e.	....	.....	...	8	2	20	....	.....	.....	.....	.....
Seattle	119	....	29.98	30.11	.....	44.4	.....	60	15	49	31	6	40	17	40	84	1.95	.....	14	4,218	s.	34	s.	28	5	7	18	7.2	....	.....	.....	.....
Tatoosh Island	86	13	29.99	30.09	+ .09	45.9	— 0.7	56	15	49	33	29	43	14	42	86	8.86	— 2.4	18	8,826	e.	48	se.	13	7	2	21	7.6	60	1891	31	1886
Astoria	....	11	....	....	....	45.8	— 1.7	58	15	51	34	25	41	16	.....	.....	8.44	— 1.3	16	.....	ne.	....	.....	...	7	8	15	....	66	1891	30	1887
Portland, Oreg	157	25	29.98	30.16	+ .06	43.8	— 2.7	63	15	50	27	25	37	22	38	83	2.93	— 3.1	13	5,409	nw.	45	s.	28	3	17	10	6.6	73	1890	22	1880
Roseburg	523	19	29.87	30.15	+ .01	42.6	— 4.1	66	1	51	21	25	34	30	36	82	3.18	— 0.4	11	2,092	se.	24	s.	28	16	7	7	4.1	74	1891	18	1880
Mid. Pac. C'st Reg.						53.0	— 0.5										2.33	— 0.4													
Eureka	64	9	30.06	30.12	+ .02	48.8	— 1.3	74	16	56	32	23	41	32	44	87	3.88	+ 1.3	10	3,775	e.	36	nw.	22	12	16	2	4.2	74	1895	32	1895
Red Bluff	334	18	29.74	30.10	— .01	53.6	+ 0.2	85	16	64	31	25	43	40	35	58	1.93	— 1.2	7	4,771	nw.	40	n.	22	18	5	7	3.7	88	1890	26	1880
Sacramento	71	19	30.00	30.08	— .02	53.1	— 0.3	75	1	63	33	26	43	29	41	67	1.54	— 0.5	7	5,711	se.	48	n.	22	19	7	4	3.3	78	*	27	1880
San Francisco	153	25	29.92	30.08	— .02	56.2	+ 0.2	83	16	62	42	26	50	32	44	70	1.78	— 1.0	7	5,529	w.	36	w.	11	18	7	5	3.7	83	1895	41	1880
Point Reyes Light	.....	6	.....	.....	.....	53.1	— 1.5	78	18	59	40	3	47	27	.....	.....	2.92	— 0.6	6	.....	nw.	....	.....	...	16	7	7	....	.....	.....	.....	.....
S. Pac. Coast Reg.						57.4	— 0.8										0.73	— 0.4													
Fresno	332	9	29.71	30.06	— .02	52.8	— 2.6	80	19	65	29	23	40	34	37	60	0.19	— 1.0	3	2,747	w.	28	w.	21	18	8	4	3.2	82	*	29	*
Los Angeles	330	19	29.67	30.02	— .02	60.1	+ 0.1	94	18	73	36	24	48	42	41	60	0.80	— 0.7	5	2,201	ne.	12	e.	23	22	5	3	1.8	96	1890	34	1886
San Diego	69	25	29.94	30.02	— .03	59.4	+ 0.2	85	15	69	38	24	50	27	45	65	1.19	+ 0.4	8	3,897	ne.	26	ne.	15	21	4	5	3.0	91	1890	38	*
San Luis Obispo	201	....	29.85	30.07	.....	56.6	.....	93	18	71	28	24	42	48	39	62	1.56	.....	4	3,117	n.	22	n.	14	20	7	3	3.0	....	.....	.....	.....

NOTE.—The data at stations having no departures are not used in computing the district averages. Letters of the alphabet denote number of days missing from the record.

*Two or more directions, dates, or years. †Received too late to be considered in departures, etc.

TABLE II.—*Meteorological record of voluntary and other cooperating observers, November, 1895.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Alco†	79	28	56.3	1.23	
Ashville*†[1]	84	21	50.7	2.18	
Bermuda†	79	24	56.2	0.86	
Carrollton*†[1]	76	26	53.9	2.74	
Citronelle†	77	34	58.0	0.92	
Claiborne Landing†				0.36	
Clanton†	76	29	54.0	1.85	
Collirene*[1]	80	28	56.3	1.05	
Cordova†				3.60	
Daphne†	82	28	59.2	1.00	
Decatur†	77	18	50.4	1.31	
Demopolis†				0.66	
Elba†	81	29	55.0	2.14	
Eufaula*†	82	31	56.6	1.46	
Evergreen†	80	26	54.6	0.90	
Florence*†				1.63	
Florence*b†	75	23	51.4	1.67	
Fort Deposit †*	80	30	55.2	0.14	
Gadsden†	80	24	52.8	3.31	
Goodwater†	80	25	53.8	1.35	
Greensboro†	78	26	54.2	1.64	
Healing Springs†	80	21	53.8	1.57	
Highland Home†	77	29	56.4	0.54	
Jasper†				2.63[d]	
Livingston†	80	24	55.8	0.46	
Lock No. 4				1.51	
Madison Station†	77	21	51.2	1.90	
Maple Grove†	73	22	50.8	2.15	
Marion†	76	25	51.0	1.20	
Mount Willing†	82	25	57.3	1.11	
Newbern†	78	27	54.4	1.93	
Newburg†	87[c]	18[c]	52.4[c]	1.75	
Newton†	78	20	57.2	0.71	
Oneonto†	79	19	49.8	1.08	
Opelika†	76	27	54.2	1.24	
Oxanna*†[1]	72	24	50.6	1.47	
Pine Apple†	80			1.50	
Pushmataha†	79	25	54.5	2.54	
Scottsboro†	80	21	51.0	2.86	T.
Selma †				1.30	
Tuscaloosa†	78	23	51.8	1.91	
Union†	79	23	54.2	1.65	
Union Springs†	80	25	53.8	3.17	
Uniontown†	77[c]	30[c]	55.4[c]	1.44	
Valley Head†	79	20	50.2	2.52	
Wetumpka				1.42	
Alaska.					
Killisnoo†	52	12	35.8	4.40	0.1
Arizona.					
Benson*[3]	80	50	63.7	0.00	
Bisbee†	70	26	47.4	2.23	2.0
Buckeye†	87	28	57 1	0.50	
Calabasas†	75	26	49.5	2.67	
Casa Grande*[3]	83	40	58.8	0.60	
Dragoon †				2.18	
Dragoon Summit*[3]	70	33	52-8	2.77	1.5
Dudleyville †	73	28	50.4	3.90	
Eagle Pass*[3]		26	42.0	4.32	2.0
Flagstaff †	59	5	32.9		
Fort Apache	63	10	38.7	2.39	1.1
Fort Grant†	77	28	49.4	2.05	0.3
Fort Huachuca†	72	23	48.2	2.73	3.8
Fort Mohave†	91	32	60.0	0.42	
Gila Bend *a*[3]	84	36	62.2	0-28	
Gila Bend *b*†	89	34	62.2	0.28	
Gisela†[c]	74	28	50.1	3.57	
Holbrook†	64	— 8	35.8	3.58	16.0
Maricopa*[3]	91	35	60.4	1.48	
Mount Huachuca†	71	23	48.2	4.45	T.
Natural Bridge†				4.25	
Navajo*†[5]	62	10	41.4		
Oracle†	68	29	49.8	6.63	6.0
Oro				1.60	
Oro Blanco	75	26	54.5	3.70	T.
Pantano*[3]	80	33	53.7	2.28	
Parker †	91	28	57.7	0.32	
Peoria†	82	35	56.7	1.35	
Phœnix	81	31	55.2	1.22	
Pinal Ranch				5.53	1.5
Reymert†	78	31	54.5	4.97	
San Carlos†	73	28	51.0	3.42	
San Simon*[3]	77	31	54.2	0.30	
Show Low				2.85	35.0
Signal†	84	30	54.9	0.65	
Sulphur Spring Valley†				1.51	T.
Texas Hill*[3]	85	28	56.3	0.10	
Tucson *c*†	83	27	55.1	4.30	
Walnut Ranch*†[1]	68	27	45.5	3.30	
Wells	79	32	55.0	2.61	
Whipple Barracks†	74	19	46.6	3.59	12.0
Wilgus†				3.30	8.0
Willcox*[3]	67	29	46.1	1.59	
Arkansas.					
Arkansas City†				3.25	
Bee Branch†	82	21	49.8	3.61	
Blanchard Springs†	77	20	52.5	5.52	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Arkansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Brinkley†	76	24	51.3	6.80	
Camden *a*†				4.33	
Camden *b*†	81	20	50.2	4.42	
Conway*[1]	75	25	48.4	6.14	
Corning†	79	22	46.0	6.00	T.
Dallas†	79[d]	20[d]	49.4[d]	4.87	
Dardanelle†				3.30	
Elon†	80	22	55.1	3.71	
Fayetteville†	78	18	47.0	2.98	2.0
Forrest†[2]	76	24	52.8	7.17	
Fort Smith					0.8
Fulton†				2.95	
Gaines Landing†				2.95	
Helena *a*†				4.98	
Hot Springs *a*	81	25	52.6	6.08	
Hot Springs *b*				6.68	
Hot Springs (near)				6.63	
Keesees Ferry†	76	16	46.3	3.63	2.0
Kirby†	76	21	50.0	6.15	
La Crosse†	72	18	46.6	3.44	
Lonoke*[3]	76	24	49.1	5-75	
Luna Landing*[6]	77	26	54.1	2.89	
Madding[2]			56.2	6.00	
Malvern†	79	21	48.6	6.89	
Mount Nebo†	73	19	48.4	4.54	
New Gascony*[1]	73[f]	26[c]	49.9[d]	6.05	
Newport *a*†				5.95	
Newport *b*†	80	23	48.8	5.76	
Newport *c*†	76	22	48.5	5.94	
Osceola†	76	25	49.6	7.68	
Ozark†	75	33	50.0	2.82	0.5
Pine Bluff†	80	26	53.8	4.11	
Pocahontas†	72	20	44.8	5-35	
Rison†	78	19	50.6	5.08	
Russellville†		21		3.67	
Silver Springs†	74	18	44.6	2.93	1.5
Stuttgart†	77	23	50.1	5.54	
Texarkana†	78	30	48.8		
Warren †	80	22	52.4	6.03	
Washington†	75	26	52.2	4.07	
Wiggs				6.53	
Winslow†	72	16	45.4	3.34	0.2
Witts Springs †	73	17	46.3	4.02	
California.					
Adin	71	9	38.2	0.60	6.0
Ager	64	16	40.6	0.53	T.
Agnew	82	28	52.4	1.36	
Arlington Heights	90	31	56.8	0.89	
Athlone*[3]	76	24	50.0	0.81	
Ballast Point L. H				1.56	
Barstow†	85	26	55.4	T.	
Bear Valley†				2.08	15.0
Berkeley	82	38	54.8	1.78	
Bishop†	83	12	42.9	0.21	T.
Bishop Creek*[3]	74	16	48.0	0.15	
Boca*[3]	80	12	38.7	0.71	7.0
Bodie†	63	— 1	27.2	0.80	12.5
Bowmans Dam†				2.81	18.0
Borden*[3]	80	25	50.8	0.36	
Caliente*[3]	78	39	53.0	1.51	
Calloway Canal†				0.73	
Cape Mendocino L. H				2.76	
Cedarville†	66	10	36.2	0.26	4.5
Centerville*[1]	86	40	56.6	1.80	
Chino* †[6]	89	30	57.5	0.66	
Chico*[3]	80	30	52.2	1.17	
Cisco*[3]	62	17	37.7		21.0
Claremont†	86			1.22	
Cloverdale*[1]	88	34	57.4	2.20	
Colegrove				1.11	
Corning*[3]	83	36	56.4	1.25	
Coronado	90	47	65.8	1.19	
Crafton	82	31	54.0	1.84	
Crescent City†	80	36	50.3	1.79	
Crescent City L. H				2.73	
Davisville *b*	90	32	60.4	1.25	
Delano*[3]	78	36	54.9	0.90	
Delta*[3]	80	33	49.9	2.15	
Drytown	79	29	51.6	0.67	
Dunnigan*[3]	82	32	54.8	1.41	
Durham*[1]	76	29	49.0	1.21	
East Brother L. H				1.85	
Edgwood*[3]	60	20	41.1	1.05	3.0
Edmanton*†[1]	70	22	39.8	3.48	14.0
Escondido	88	31	57.0		
Evergreen				1.48	
Fall Brook*[1]	90	38	55.2	1.46	
Folsom City *b*†[1]	75	35	51.4	2.06	
Fordyce Dam				2.71	28.0
Fort Bragg†	89	27	54.0	2.55	
Fort Ross				5.34	
Fort Tejon				1.42	
Georgetown†	83	30	50.6	2.18	T.
Glendora				1.48	
Goshen*[3]	76	28	49.7	0.98	
Grass Valley				1.17	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenville†	74	12	39.8	1.60	2.8
Guinda				2.00	
Healdsburg*[1]	92	28	56.0	3.30	
Hollister	84	24	51.5	0.88	
Hueneme				1.09	
Humboldt L. H				3.40	
Hydesville†	76	25	48.7	2.36	
Indio*[3]	95	42	64.6	0.00	
Iowa Hill*[1]	88	33	52.4	1.61	
Jackson	74	32	48.2	0.93	
Jolon				0.96	
Julian†	77	25	48.7	2.60	T.
Keeler*[3]	79	35	53.9	0.00	
Keene*[3]	72	28	48.8	1.65	
Kennedy Gold Mine	76	32	51.2	0.90	
Kernville				0.95	
King City*[3]	80	24	48.6	0.51	
Kingsburg*[3]	70	30	49.2	0.53	
Kono Tayee	82	37	52.0	1.69	
Lagrange*[3]	77	29	54.0	0.72	
La Porte*†[1]	72	19	39.8	3.35	28.0
Lemoore *a*[3]	75	25	49.8	0.70	
Lick Observatory†	80	28	47.9	2.46	1.5
Lime Kiln	84	31	54.8		
Lime Point L. H				1.85	
Lodi	74	27	51.6	1.24	
Los Alamos†				0.85	
Los Gatos *b*	80	34	51.7	1.24	
McMullin*[1]	82	28	52.6		
Malakoff Mine*[1]	82	30	48.0	2.27	3.0
Mammoth Tank*[3]	83	36	58.4	0.12	
Manzana	75	19	45.8	0.48	
Mare Island L. H.				1.58	
Merced*[3]	76	30	53.0	0.69	
Middletown*†[1]	92	24	50.7	3.06	
Mills College				1.91	
Milton (near)*[1]	79	42	56.8	1.11	
Modesto*[3]	78	30	51.2	0.70	
Mohave*[3]	80	27	50.3	0.14	
Mokelumne Hill*[3]		36	49-7	1.12	
Monterey*[3]	76	31	53.7	0.82	
Mount Frazier†				0.90	
Mount Glenwood*[1]	88	38	57.6	2.06	
Mutah Flat†				1.60	
Napa *b*	90	36	55.3	1.72	
Needles†	79	34	57.7	T.	
Nevada City†	83	33	46.4	1.87	
Newcastle *a*†	80	34	51.7	1.40	
Newhall*[3]	94	36	53.8	1.09	
Nordhoff†	82	30	57.4	0.62	
Oakland *a*	83	38	53.9	2.09	
Ogilby*[3]	90	39	59.2	0.15	
Oleta*[1]	75	29	47.0	0.74	
Orange	91	33	58.6	1.26	
Orangevale†	73	35	51.8	1.68	
Orland*[3]	88	30	52,9	1.34	
Ormonde†				2.18	4.0
Oroville *b*	83	42	61.2	1.85	
Palermo†	87	26	51.2	1.20	
Paso Robles *b*	76	18	47.4	1.53	
Picacho	88	40	67.8	0.50	
Piedras Blancas L. H				1.26	
Pigeon Point L. H				0.87	
Pilot Creek				1.72	1.8
Placerville *b*	85	19	46.0	0.77	
Point Ano Nuevo L. H				1.63	
Point Arena L. H				3.06	
Point Bonita L. H				2.82	
Point Conception L. H				0.68	
Point Fermin L. H				1.42	
Point George L. H				0.94	
Point Hueneme L. H				1.25	
Point Lobos	74	41	54.2	2.33	
Point Loma L. H				0.61	
Point Montara L. H				1.37	
Point Pinos L. H				1.34	
Point Reyes L. H				2.52	
Point Sur L. H				1.14	
Pomona (near)	96	29	58.2	1.08	
Portersville*[3]	81	34	53.4	1.71	
Poway*[3]	92	29	52.6	1.44	
Quincy†	59	16	39.0	1.53	2.0
Ravenna*[3]	84	32	53.8	0.00	
Redding *b*†	86	29	53.8	2.12	
Reedley (near)*[1]	78	33	53.2	0.15	
Represa	70	32	52.9	1.98	
Rio Vista	74	27	52.2	1.82	
Riverside†	90	29	56.6	1.25	
Robertsons Mill				0.52	
Roe Island L. H				1.15	
Rosewood	83	21	48.8	1.70	2.0
Sacramento *a*	72	30	51.6	1.55	
Salton*[3]	98	34	69.9	T.	
San Bernardino†	88	29	56.3	1.14	
San Jacinto	86	26	54.4	2.09	
San Jose *b*	81	25	50.5	1.08	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
San Leandro *[1]	85	40	57.4	2.31	
San Luis L. H	.....	.....	.....	1.90	
San Luis Obispo *a*	.....	.....	.....	1.71	
San Mateo *[c]	79	41	56.5	2.08	
San Miguel *[6]	84	21	51.0	1.05	
San Miguel Island †	90	38	59.2	0.40	
San Rafael †	79	30	51.2	2.69	
Santa Ana *[5]	95	50	65.8	0.80	
Santa Barbara *a*	91	41	59.9	0.77	
Santa Barbara L. H	.....	.....	.....	0.88	
Santa Clara *a* *[6]	82	34	55.2	1.17	
Santa Cruz *b* †	87	33	55.3	1.89	
Santa Cruz L. H	.....	.....	.....	1.66	
Santa Maria	88	33	57.8	1.26	
Santa Monica *[8]	82	50	62.6	1.10	
Santa Paula *b* †	92	34	58.9	0.90	
Santa Rosa *[8]	81	30	52.8	1.83	
Shasta	.....	.....	.....	2.68	
Shasta Springs †	68	22	42.7	2.00	4.0
Sneddens Ranch †	.....	.....	.....	0.91	
S. E. Farallone L. H	.....	.....	.....	2.23	
Stanford University	79	30	52.6	1.11	
Stockton *a*	72	28	50.8	1.09	
Summerdale †	.....	.....	.....	1.71	10.0
Susanville †	64	16	39.5	1.95	3.0
Sutter Creek *[5]	72	23	45.4	0.26	
Tecarte Dam *[4]	88	22	46.0	3.00	
Tehama *[5]	84	32	52.9	1.47	
Tejon Ranch	.....	.....	.....	1.41	
Templeton *[8]	78	20	49.0	1.83	
Trinidad L. H	.....	.....	.....	2.06	
Truckee *[8]	64	14	36.2	.....	5.0
Tulare *b*	.....	.....	.....	1.13	
Tulare *c*	86	24	53.0	0.98	
Turlock *b* †	78	21	50.2	0.82	
Ukiah †	79	20	48.2	2.81	
Upper Mattole *[1]	76	29	48.4	4.73	
Vacaville *a* *[1]	89	35	55.2	2.15	
Ventura †	94	39	59.8	0.74	
Volcano Springs *[8]	90	38	65.2	0.00	
West Point †	.....	.....	.....	1.35	
Wheatland	86	27	50.0	1.59	
Williams *[4]	90	28	54.8	1.25	
Willows *b* *[8]	85	30	55.0	2.48	
Wilmington *[5]	88	44	62.4	.....	
Wire Bridge *[5]	85	25	50.2	1.27	
Yerba Buena L. H	.....	.....	.....	1.03	
Yreka †	64	13	39.3	0.86	
Yuba City *[5]	80	35	56.6	1.85	
Engineers Quarters ‡	.....	.....	.....	2.65	8.5
Morses House ‡	.....	.....	.....	4.18	11.5
Grass Valley ‡	.....	.....	.....	3.26	9.0
Deep Creek ‡	.....	.....	.....	2.45	8.0
Holcomb Creek ‡	.....	.....	.....	1.66	5.2
Squirrel Inn ‡	.....	.....	.....	2.92	5.0
Green Valley ‡	.....	.....	.....	5.04	21.0
Tunnel No. 2 ‡	.....	.....	.....	2.34	.....
Colorado.					
Alma †	52	— 5	23.8	1.13	10.0
Antlers †	56	— 1	31.4	1.45	12.0
Boxelder	.....	.....	.....	0.53	7.5
Breckenridge †	69	— 7	24.4	1.76	17.6
Byers *[1]	60	10	31.1	.....	2.0
Canyon †	73	0	38.8	0.58	10.5
Castle Rock †	64	0	30.7	0.80	8.0
Climax †	.....	.....	.....	1.50	15.0
Collbran	.....	.....	.....	2.65	24.2
Colorado Springs †	70	— 3	35.1	0.32	4.6
Cope †	73	— 4	36.2	0.22	2.2
Crook	80	2	36.4	0.90	.....
Deer Trail *[5]	70	5	37.2	.....	7.0
Delta †	61	4	34.7	1.55	7.0
Denver	.....	.....	.....	.....	3.8
Divide Exper. Station	65	— 5	31.4	0.53	5.0
Dumont *† [5]	63	5	34.0	0.40	4.0
Durango †	56	8	34.5	2.22	.....
First View *[6]	70	6	41.8	.....	
Fleming	.....	.....	.....	0.50	5.0
Fort Collins †	74	— 3	33.7	0.40	4.2
Fox	.....	.....	.....	1.00	7.5
Garnett	.....	.....	.....	0.65	6.5
Glen Eyrie †	64	2	35.6	0.51	.....
Gold Hill *[1]	65	— 2	34.2	0.56	6.8
Grand Junction †	57	19	38.5	2.39	9.0
Greeley †	68	—10	31.9	0.40	3.5
Gulch †	53	4	28.6	1.36	25.0
Gunnison †	50	—20	24.2	1.00	10.0
Holly	.....	.....	.....	0.30	2.0
Holyoke *a*	.....	.....	.....	0.37	4.2
Holyoke *b*	.....	.....	.....	0.30	3.0
Hugo *† [5]	70	10	41.3	0.50	5.0
Hugo (near) †	70	3	32.8	0.10	2.0
Husted †	75	— 5	36.0	0.51	7.0
Jamestown	60	— 4	29.8	0.54	3.2
Julesburg †	75	— 4	34.6	0.06	4.0
Kit Carson *[1]	70	10	37.8	.....	3.0
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
La Jara †	60	— 1	31.0	0.86	8.0
Lake Moraine †	54	1	27.8	0.57	7.3
Lamar †	.....	.....	.....	0.24	1.6
Laporte	.....	.....	.....	0.65	6.5
Las Animas †	73	— 6	33.0	0.30	3.0
Lay *† [1]	58	— 9	27.8	2.57	22.0
Leadville (near) †	.....	.....	.....	0.65	8.5
Le Roy †	76	2	34.7	0.47	4.5
Longmont †	70	0	33.8	0.44	3.3
Loveland	.....	.....	.....	0.57	4.0
Meeker †	59	— 5	27.6	1.56	22.4
Millbrook †	67	—10	28.7	1.01	11.8
Minneapolis †	80	5	40.7	0.60	2.5
Monte Vista	55	— 6	26.6	0.23	3.5
Montrose †	70	5	36.6	2.50	9.5
Moraine †	58	— 5	30.5	0.35	5.0
Ouray †	54	6	31.4	4.70	47.0
Pagoda †	66	— 5	26.0	1.95	19.5
Paonia †	.....	.....	.....	1.51	.....
Parachute †	58	1	31.4	2.28	13.0
Pinkhamton	.....	.....	.....	1.65	16.5
Pueblo	.....	.....	.....	.....	3.8
Rangely †	57	— 7	27.9	1.10	11.0
Redcliff	.....	.....	.....	0.15	1.5
Rico †	.....	— 3	.....	.....	70.2
River Bend *[5]	68	6	36.7	.....	8.0
Rocky Ford †	76	— 3	36.7	0.20	3.0
Ruby †	.....	.....	.....	10.73	107.3
Saguache †	55	— 6	32.4	0.60	6.0
St. Cloud †	.....	.....	.....	0.25	2.5
San Luis †	67	— 5	30.5	1.03	12.0
Santa Clara *† [1]	63	0	30.2	0.40	4.0
Seibert †	.....	.....	.....	0.28	4.0
Smoky Hill Mine †	72	— 5	34.0	0.50	5.0
Stamford *[1]	58	2	27.6	1.80	18.0
Surface Creek †	58	6	33.0	1.93	17.5
Thon †	76	3	36.4	0.50	5.0
T. S. Ranch †	59	11	34.2	1.35	7.0
Twin Lakes	.....	.....	.....	0.82	18.0
Vilas	.....	.....	.....	0.46	3.0
Wallet †	.....	.....	.....	1.65	3.0
Watkins *[1]	60	6	31.4	.....	.....
Wray †	75 *e*	— 4 *e*	33.6 *e*	0.12	3.5
Yuma	.....	.....	.....	0.60	5.0
Connecticut.					
Bridgeport	64	20	44.4	4.12	T.
Canton †	71	12	41.2	3.96	
Colchester	71	16	43.5	6.50	1.0
Falls Village	.....	.....	.....	3.80	1.0
Greenfield Hill	.....	.....	.....	4.99	T.
Hartford *b*	.....	.....	.....	7.40	T.
Hartford *c*	70	23	43.8	.....	
Lake Konomoc	.....	.....	.....	8.31	
Middletown	71	18	44.7	7.36	T.
New Haven	.....	.....	.....	.....	T.
New London †	70	21	44.6	3.75	T.
North Grosvenor Dale	68	15	40.0	9.69	
Norwalk	68	15	42.2	4.07	
Southington *[1]	70	19	41.2	6.93	
South Manchester	.....	.....	.....	5.63	
Storrs	70	13	41.7	6.97	T.
Thompson *†	72	15	41.0	.....	.....
Voluntown †	72	15	44.4	7.93	
Wallingford †	.....	.....	.....	5.39	
Waterbury	72	19	44.8	5.22	T.
West Simsbury	.....	.....	.....	4.12	1.0
Windsor	69	18	42.0	5.38	0.5
Delaware.					
Dover †	76	26	47.2	2.26	
Milford	78	25	50.2	1.49	
Millsboro	77	23	48.8	2.66	
Newark	75	20	45.1	1.06	
Seaford †	75	25	48.4	2.60	
Wilmington †	76	26	47.8	1.57	T.
District of Columbia.					
Dist'ing Reservoir *[5]	75	25	46.3	2.13	
Receiving Reservoir *[5]	75	25	45.9	2.05	
Washington	.....	.....	.....	.....	T.
West Washington	80	24	48.0	1.39	T.
Florida.					
Amelia †	80	34	60.0	3.19	
Archer †	85	35	62.6	4.00	
Avon Park †	80	43	70.0	3.31	
Bartow †	84	36	65.4	2.42	
Brooksville †	82	39	64.8	2.23	
Clermont †	87	44	66.9	1.53	
Earnestville †	85	38	65.0	2.18	
Eustis †	86	38	65.0	2.10	
Federal Point †	84	36	62.6	3.60	
Fort Meade †	83	32	65.0	2.85	
Frostproof *† [1]	86	43	67.9	4.27	
Grasmere †	84	40	65.6	1.85	
Green Cove Springs †	82	34	59.3	3.58	
Hypoluxo *† [1]	89	53	74.4	3.86	
Kissimmee †	87	38	69.8	5.10	
Lake City †	82	37	63.2	2.76	
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lemon City † [1]	87 *	48	76.3	3.00	
Manatee †	85	40	65.4	1.44	
Merritts Island †	84	47	69.9	4.24	
Milton †	.....	.....	.....	1.45	
Mullet Key †	80	50	67.0	1.26	
Myers †	86	46	70.2	0.79	
New Smyrna †	84	37	66.1	2.79	
Oak Hill *[1]	84	48	69.6	.....	
Ocala *† [1]	83	34	62.0	3.03	
Orange City †	86	34	65.6	2.16	
Orange Park	81	33	59.9	3.18	
Orlando †	90	42	67.7	1.57	
Plant City †	89	36	67.0	2.17	
St. Francis †	89	35	66.6	.....	
St. Francis Barracks	83	37	62.3	5.53	
Tallahassee †	80	30	57.6	2.21	
Tarpon Springs †	83	40	64.8	2.66	
Georgia.					
Adairsville † [c]	76	25	49.4	1.64	
Albany †	80	29	55.1	0.94	
Americus †	84	26	54.8	0.78	
Athens *a*	78	26	52.5	2.40	
Blakely *† [5]	85	30	57.1	0.61	
Canton †	.....	.....	.....	1.64	
Clayton †	73	19	49.6	2.75	
Covington	79	25	51.8	1.76	
Dahlonega †	77	22	52.3	2.30	
Diamond †	74	20	47.6	2.21	
Elberton †	.....	26	.....	2.98	
Fleming †	83	27	56.6	3.63	
Forsyth *[1]	84	32	58.4	1.55	
Fort Gaines †	80	28	54.1	0.73	
Gainesville †	74	23	49.6	1.55	
Gillsville †	77	23	53.0	1.27	
Hawkinsville †	83	30	57.8	.....	
Lagrange †	78	25	52.5	0.75	
Louisville †	83	26	53.2	1.03	
Marietta †	75	25	51.8	0.89	
Marshallville †	82	28	56.6	0.80	
Milledgeville †	81	28	53.0	1.22	
Millen †	84	26	54.3	1.79	
Monticello *† [1]	76	38	56.7	2.94	
Morgan †	83	24	56.2	1.76	
Point Peter *[1]	74	26	52.6	3.30	
Poulan †	85	27	56.2	1.05	
Quitman †	81	29	56.1	1.96	
Ramsey †	81	23	53.2	2.04	
Resaca †	.....	.....	.....	1.80	
Rome †	76	26	50.8	1.97	
Talbotton †	78	28	54.2	1.12	
Thomasville †	83	29	57.4	2.08	
Toccoa †	.....	.....	.....	2.14	
Washington †	.....	.....	.....	2.84	
Idaho.					
American Falls †	61	— 2	32.3	0.54	2.0
Atlanta †	48 *e*	7 *e*	29.4 *e*	1.29	18.0
Bannister †	70	10	40.9	1.30	13.0
Blackfoot †	59	0	30.3	.....	.....
Bliss †	65	7	36.1	0.47	3.4
Boise Barracks †	61	12	36.8	0.71	0.2
Challis	66	4	38.4	0.55	5.5
Chesterfield †	58	— 8	25.6	0.39	6.0
Cœur d'Alene	60	12	38.4	.....	
Corral *† [1]	56	2	29.7	0.55	5.5
Dairy †	60	9	35.2	0.84	5.8
Fort Lemhi †	58	— 3	29.8	0.54	6.5
Fort Sherman †	59	11	36.7	2.60	0.6
Grangeville	61	5	35.6	1.20	4.4
Idaho City †	67 *f*	6 *f*	33.8 *f*	1.02	7.2
Idaho Falls	.....	.....	.....	.....	5.9
Kootenai †	66	7	34.6	1.96	5.0
Lake † *f*	50	—10	23.6	1.40	14.0
Lewiston †	64	.....	.....	1.44	.....
Lost River †	.....	.....	.....	0.24	3.7
Martin †	55	3	25.4	0.70	7.0
Moscow †	67	10	37.8	1.77	.....
Murray †	54	10	32.6	2.91	18.0
Nampa	64	8	36.8	0.52	T.
Oakley †	67	9	35.3	0.50	5.0
Paris †	70	— 4	31.2	1.31	.....
Payette †	66	7	39.4	0 15	
St. Anthony	72	10	36.2	0.54	5.0
Salubria †	58	7	36.6	0.90	3.8
Soldier †	70	2	32.8	0.58	5.8
Swan Valley †	59	— 5	28.0	1.12	14.4
Warren †	63	—17	33.2	1.80	4.0
Illinois.					
Albion †	77	16	43.4	5.48	T.
Alexander †	74	3	39.6	2.78	4.0
Altamont *[5]	78	18	46.5	1.99	1.5
Ashton *† [1]	66	— 1	31.6	2.33	15.5
Atlanta	.....	.....	.....	3.64	10 0
Atwood *a* *† [2]	70	10	36.7	5.04	2.5
Atwood *b*	.....	.....	.....	3.42	.....
Aurora *b* †	70	— 2	33.8	5.41	34.0
Beardstown †	.....	.....	.....	3.50	8.0

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bloomington†	72	9	38.0	3.74	10.5
Bushnell†	74	8	38.7	3.20	4.0
Cairo					T.
Cambridge	72	8	36.8	2.74	
Carlinville†	79	8	40.2	2.91	6.0
Carlyle				3.64	
Carrollton	71	10	38.3	2.37	5.7
Catlin†	74	8	38.6	3.53	1.0
Cazenovia*†	68	6	35.1	3.76	7.0
Chemung*[1]	68	— 2	33.1	2.10	19.8
Chester†				4.88	1.0
Chicago					14.5
Cisne†	58[3]	22[3]	41.0[3]	3.97	
Clear Creek†	72	— 2	36.4	4.31	7.8
Coatsburg†	74	9	39.7	3.36	3.0
Cordova†				2.75	4.0
Decatur†	75	9	39.8	3.12	6.5
Dixon†	71	4	34.5	2.50	9.5
Duquoin*[1]	74	23	43.9	5.57	T.
East Peoria†	73	2	38.8	4.10	5.5
Effingham†				2.50	
Evanston*[10]	68	7	37.2		
Flora*[1]	77	18	43.3	4.69	T.
Fort Sheridan†	68	7	35.4	2.14	8.4
Frederick*[5]	74	9	37.7	3.82	8.2
Friend Grove*†[5]		28	45.3	5.98	T.
Galva†	72	6	35.4	2.18	7.0
Gilman†	75	6	39.8	2.80	7.0
Glenwood*†[1]	78	— 2	34.0	2.76	11.0
Golconda†	71	28	47.4	7.30	T.
Grafton†				4.61	7.5
Greenville†	76	12	41.3	4.56	3.5
Griggsville†	73	10	41.9	2.95	12.4
Halliday*[5]	73[4]	22[4]	45.4[4]	4.94	T.
Havana†	73	8	40.7	3.80	7.0
Herrins Prairie*[1]	74	26	47.4	6.61	0.1
Hillsboro*†[1]	76	13	42.0	3.28	4.5
Iron†	76	26	46.0	7.37	
Joliet†	69	4	37.8	2.90	17.2
Jordans Grove†	78	18	43.8	4.30	0.8
Kankakee a†	72	4	38.6	3.02	
Kankakee b†	68[4]	10[4]	38.0[4]		
Knoxville*[5]	71	5	38.0	3.51	4.8
Lagrange†	70	4	35.5	5.09	19.0
La Harpe*[1]	70	6	36.9	3.40	8.0
Lanark*†[1]	68	4	33.9	2.02	5.0
Lexington†	70	7	37.4	2.80	8.5
Loami				3.17	4.0
Louisville†	71	17	42.6	4.34	0.3
McLeansboro*†[3]		22	41.2	5.57	
Martinsville†	70	16	40.6	4.75	1.5
Mascoutah*[5]	76	18	41.1	3.75	4.5
Mattoon	71	18	43.2	2.61	0.2
Minonk*†[1]	69	6	36.5	4.08	13.8
Monmouth†	74	7	37.0	2.06	3.9
Morrisonville†	75	13	39.8	3.28	4.5
Mount Carmel†				5.75	0.2
Mount Pulaski	75	12	39.8	2.67	9.5
Mount Vernon	74	21	46.0	4.66	0.5
New Burnside†	74	20	45.8	7.08	T.
Olney a*[1]	75	22	44.4	4.40	0.3
Olney b*[1]	71	11	38.7	5.00	0.3
Oswego*[1]	67	2	33.7	4.53	14.0
Ottawa†	71	— 1	35.8	5.27	12.5
Palestine†	76	18	42.3	4.85	0.8
Paris†	71	10	39.6	4.84	2.0
Peoria a†				4.82	10.0
Peoria b	74	11	39.4	4.17	5.0
Philo†	72	4	38.4	3.24	2.0
Plum Hill*†[5]	76	21	40.8	3.29	0.7
Rantoul*†[1]	73	2	37.6	3.25	9.5
Reynolds	73	6	35.8	1.02	7.3
Riley†	68	1	32.7	2.69	13.6
Rockford†	70	— 2	34.4	3.34	18.5
Rose Hill *†[1]	74	24	44.5	2.87	
Rushville	75	8	37.9	4.72	4.9
St. John*†[1]	72	22	42.4		
Scales Mound†	70	10	35.8	1.62	8.2
Springfield					5.1
Streator†	68	— 1	37.1		9.0
Sycamore*†[1]	66	— 2	35.8	3.71	33.0
Tiskilwa*[3]	69	16	34.8	3.31	17.0
Tuscola*†[1]	73	12	40.8	2.92	2.5
Walnut†	72	9	36.2	2.60	10.1
Wheaton*[3]		6	32.4	5.00	24.5
Winnebago†	71	— 6	32.6	3.07	17.0
Zion†	69	5	34.4	1.82	7.5
Indiana.					
Anderson†	72	14	41.4	5.40	1.2
Angola*[1]	73	11	37.5	5.56	4.2
Ashboro†	70[4]	14[4]	40.4[4]	5.29	1.0
Bedford†	75	19	44.6	7.15	T.
Bluffton†	72	9	38.8	4.62	1.0
Butlerville†	76	16	42.5	6.89	0.2
Cambridge City†	73	16	40.1	6.27	0.3
Columbia City*[1]	66	14	37.8	4.56	2.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Indiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Columbus†	75	18	40.8	5.93	0.5
Connersville†	76	17	40.6	5.79	T.
Delphi	69	16	41.4	4.30	0.2
Edwardsville*†[1]	76	22	45.5	7.62	T.
Evansville†	75	20	44.2	9.54	T.
Farmland†	73	16	41.8	5.99	
Franklin*[1]	76	19	41.1	5.43	T.
Greencastle†	69	15	41.0	4.56	0.2
Hammond†	72	4	36.0	1.77	8.0
Huntington	69	15	38.6	5.28	2.0
Indianapolis					1.2
Jasper†	73	19	43.8	6.52	0.5
Jeffersonville	76	24	44.8	6.89	T.
Kokomo†	70	14	40.2	4.71	0.6
Laconia	77	17	43.8	5.90	
Lafayette†	70	11	39.6	3.83	0.3
Logansport b	71	16	41.1	4.12	1.0
Lyford†	70	13	41.3	4.34	1.0
Madison†	78	20	44.6	6.72	T.
Marengo*†[1]	76	20	42.7	13.01	0.1
Marion†	70	14	40.8	5.42	0.5
Mauzy†	76	13	39.8	6.12	1.0
Mount Vernon†	72	23	44.7	6.75	T.
Princeton*†[1]	74	23	43.8	6.25	1.0
Rockville†	72	8	40.7	4.45	0.5
Scottsburg*[1]	77	20	42.0	5.95	
Seymour†	73	20	42.7	6.13	T.
South Bend†	71	7	38.0	3.84	15.0
Sunman	72	14	39.8	6.37	0.4
Syracuse†				4.71	
Terre Haute†	70	18	43.1	4.58	0.2
Valparaiso†	70	6	36.4	2.55	8.0
Vevay	79	18	43.8	5.20	T.
Vincennes†	76	14	40.5	5.22	T.
Worthington†	75	17	42.7	6.36	1.2
Indian Territory.					
Eufaula†				3.75	T.
Healdton†	79	14	49.8	3.62	4.0
Kemp†	78	22	51.4	3.83	T.
Lehigh†	82	18	50.0	3.43	1.5
Tahlequah†	84	11	48.0	3.98	
Tulsa†				5.80	
Vinita†	74	13	46.2	5.17	
Iowa.					
Afton	73	0	35.8	1.13	T.
Algona*[1]	70	2	32.0	1.53	8.5
Alta†	68	— 6	31.4	0.88	4.5
Amana†	71	3	34.4	1.64	1.0
Ames b	73	— 7	32.2	1.09	3.2
Ames c				1.38	3.0
Atlantic†	73	— 2	34.4	1.52	3.0
Audubon	72	— 3	35.6	1.46	3.5
Belknap	75	3	36.6	1.70	6.0
Belle Plaine	73	0	33.4	1.87	1.5
Bonaparte†	75	4	37.5	2.19	4.5
Carroll	71	— 8	32.2	1.41	3.5
Cedar Falls†	71	0	34.3	1.55	2.0
Cedar Rapids†	70	5	35.4	1.83	2.3
Centerville†	73	— 1	41.3	1.91	3.0
Chariton*[1]	73	1	37.7	1.65	1.5
Charles City†	66	— 9	30.6	1.96	9.6
Clarinda†	73	0	34.1	1.23	1.0
Clinton	71	3	35.3	2.75	8.5
College Springs	74	1	37.8	1.39	0.9
Corning†	74	0	36.7	1.78	2.0
Cresco†	70	— 9	29.7	1.60	7.0
Davenport					8.7
Decorah†	73	— 3	33.7	1.36	5.0
Delaware*[5]	70	5	31.4	1.99	2.2
Denison†	70	— 3	32.2	0.65	2.0
Des Moines					1.2
Dubuque					8.0
Elkader†	74	3	33.1	1.77	5.0
Emmetsburg	74	— 5	29.9	0.68	2.8
Esthervile	70	— 5	29.1	0.88	4.0
Fairfield†	72	2	36.3	1.58	3.0
Fayette†	73	— 2	32.5	1.93	7.8
Forest City	71	—10	28.5	1.75	6.0
Fort Madison*†[1]	77	10	39.7	2.82	7.0
Galva†	69	— 3	32.3	0.82	4.0
Garden Grove	74	2	34.0	1.12	0.2
Glenwood†	86	— 2	38.4	1.27	2.5
Grand Meadow*[1]	64	2	31.6	1.60	4.5
Greenfield†	74	— 3	37.4[4]	1.77	1.8
Grinnell†	71	2	35.3	1.81	1.2
Grundy Center	70	— 2	32.9	1.79	3.0
Guthrie Center	70	— 5	34.5	0.97	4.0
Hampton	70	— 8	30.8	2.17	8.0
Hawkeye				1.93	9.5
Hopeville†	73	— 1	36.2	1.15	1.5
Humboldt†	69	6	31.7	1.42	12.0
Independence†	73	— 2	33.0	1.40	4.5
Indianola†	74	— 2	35.8	1.08	T.
Iowa City a†	73	3	35.7	1.78	3.2
Iowa City b	74	4	36.5		
Iowa Falls†	70	— 8	31.2	1.06	5.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Keokuk					3.3
Keosauqua†	76	5	38.1	1.14	2.0
Knoxville	73	0	35.9	1.43	1.5
Larrabee†	70	— 9	32.5	1.06	5.6
Le Claire†				1.88	0.5
Lenox*[1]	73	1	36.6	1.57	1.1
Logan†	74	— 4	35.2	1.09	3.0
Madrid	73	—10	31.9	1.30	2.3
Malvern*[1]	76	— 5	30.6	1.30	2.0
Marshall†	70	— 2	33.1	1.15	1.5
Mason City†	69			1.92	12.2
Maxon*[1]	74	— 2	36.8	1.59	3.2
Mechanicsville	71	6	34.5	2.30	9.2
Monticello*†[1]	68	2	30.5	1.53	3.0
Mooar	75	6	36.8	3.01	
Mount Ayr†	72	— 1	35.8	1.04	1.0
Mount Pleasant*[1]	71	5	38.2	2.46	7.6
Mount Vernon*[1]	72	4	35.0	1.81	
Neola	76	— 9	35.3	1.17	2.7
Newton†	71	— 1	35.4	1.30	3.0
North McGregor†				1.33	3.0
Ogden	74	— 8	34.8	1.74	3.8
Osage*†[3]		— 6	28.8	1.95	12.0
Oskaloosa†	74	0	35.6	1.17	2.5
Ottumwa	75	3	37.6	1.94	2.8
Ovid†	75	— 3	36.4	1.91	3.0
Panama†[2]		— 2	31.2	1.22	2.8
Portsmouth	79	— 3	36.6	1.08	3.0
Primghar	68	—10	31.4	1.01	6.5
Rock Rapids	62	—10	29.9	1.06	6.0
Sac City†	62	— 2	32.2	1.00	5.5
Seymour†	74	— 2	38.0	1.55	3.0
Sibley		— 9		0.80	4.0
Sidney	84	0	40.9	1.14	1.5
Sioux City					5.9
Spirit Lake†	71	— 7	28.8	0.67	4.0
Toledo	76	0	33.4	1.37	3.0
Villisca†	75	— 1	34.9	1.55	1.5
Vinton*[1]	71	2	34.4	1.11	2.0
Washington†	74	4	36.2	1.54	2.5
Waterloo	73	0	34.4	1.73	5.4
Waukee	78	2	38.0	1.15	1.5
West Bend*†[1]	85	0	30.4	1.70	10.0
What Cheer				0.45	4.5
Williams	70	—12	32.6	1.94	7.0
Wilton Junction†	70[4]	7[4]	36.1[4]	2.48	6.0
Winterset†	73	— 5	34.6	0.96	1.0
Kansas.					
Abilene†	78	10	41.4	1.39	
Achilles*[5]	74[4]	5	36.4[1]	0.75	3.5
Altoona*†[3]	75	7	39.2	2.98	3.0
Atchison†	78	7	40.0	1.71	T.
Baker	77	6	40.0	0.77	T.
Beloit†	73	3	38.2	1.02	2.0
Blaine	76	0	39.3	1.58	0.5
Burlington†	80	3	41.0	2.75	2.0
Campbell	75	— 1	38.6	1.29	1.5
Colby†	71	— 1	37.2	0.70	3.0
Coldwater†	75	11	41.2	0.95	
Collyer*[5]	70	10	39.2	1.25	2.0
Columbus†	75	5	42.4	4.19	6.0
Concordia					2.0
Coolidge†	75	— 2	37.3	0.40	1.5
Cunningham†	75	10	42.8	1.10	T.
Dodge City					0.8
Downs				1.41	2.2
Dresden*†[1]	80	3	37.9	1.15	5.0
Eldorado†	74	8	41.7	2.50	0.1
Elk City*[1]	72	8	43.6	2.80	3.5
Ellinwood*[3]	75	16	38.4	1.33	
Emporia†	74	12	42.9	2.65	T.
Englewood†	78	12	43.2	0.71	0.2
Eureka†				1.87	
Eureka Ranch†	72	2	38.7	1.02	1.5
Fort Riley†	79	9	42.4	1.48	T.
Fort Scott				3.83	T.
Frankfort	82	6	42.2	1.60	0.5
Garden City†	75	3	39.1	0.55	2.0
Garfield				0.55	0.2
Gibson*[1]	70	2	37.0	0.84	2.0
Girard*[1]	72	5	42.8	3.32	3.0
Goodland†	72	4	38.2	0.91	6.5
Gove*†[1]	79	7	37.7	0.84	3.0
Grainfield				0.20	2.0
Grenola*[1]	72	7	42.2	1.70	2.0
Halstead	72	6	39.2	0.87	T.
Hays†	75	— 6	37.4	0.05	0.5
Horton†	77	8	40.5	0.66	T.
Hutchinson†	79	13	44.2	1.03	0.6
Independence†	72	5	43.7	2.34	3.0
Ionia†	74	— 2	37.9	2.65	2.0
Jaqua†	76	— 2	36.4	1.16	1.0
Lawrence[1]	74[4]	8	41.6	1.90	
Lebo†	78	6	43.0	3.09	1.4
Macksville†	75	10	41.3	1.45	T.
McPherson†	75	8	41.0	0.75	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Kansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Manhattan *b*	80	9	41.8	1.17	T.
Manhattan *c*	.....	.....	.....	1.36	1.0
Marion †	75	11	42.8	0.75	T.
Meade †	79	13	44.0	1.33	1.0
Medicine Lodge †	74[4]	15[4]	40.8[4]	1.21	.....
Minneapolis †	76	5	41.1	1.04	1.2
Morland †	78	1	39.4	1.20	4.0
Morton †	77	5	40.6	0.56	3.0
Mount Hope *[1]	77	14	44.9	1.05	T.
Ness City †	.....	.....	.....	0.77	1.5
New England Ranch †	73	4	41.4	0.76	1.8
Norwich †	.....	.....	.....	1.58	.....
Oberlin †	.....	.....	.....	1.65	10.0
Olathe †	75	5	42.3	2.96	3.5
Oswego †	77	23	45.8	3.45	4.0
Ottawa †	76	5	42.8	1.84	2.0
Paola †	80	8	42.2	3.45	4.0
Phillipsburg †	74[4]	4[4]	38.4[4]	1.32	4.0
Pleasant Dale †	78	6	41.0	0.65	0.5
Rome *† [1]	72	11	43.1	2.12	3.0
Russell †	74	6	41.2	1.10	1.0
Salina †	77	8	41.1	0.79	T.
Sedan †	78	5	46.4	2.86	2.5
Sharon Springs *[1]	76	8	38.2	0.45	2.0
Topeka	.....	.....	.....	.....	0.3
Tribune †	.....	.....	.....	0.88	3.0
Ulysses †	.....	.....	.....	0.35	1.0
Wakefield *[1]	78	10	43.1	1.60	0.5
Wallace *[1]	70	4	37.7	0.42	1.8
Wamego *[1]	78	10	40.1	0.62	T.
Wellington *[1]	72	16	45.6	1.59	.....
Wichita	.....	.....	.....	.....	0.1
Winfield *[5]	74	8	43.0	1.30	1.5
Winona *[5]	72	12	42.3	0.37	1.2
Yates Center †	76	— 1	41.9	2.56	3.0
Kentucky.					
Alpha †	83	20	49.7	1.73	T.
Anchorage †	78	19	45.3	4.71	T.
Blandville †	74	22	45.5	4.75	T.
Bowling Green *a* *[1]	77	16	43.8	4.61	T.
Bowling Green *b* †	79	21	47.3	4.08	.....
Burnside †	.....	.....	.....	2.28	.....
Caddo *† [1]	76	18	43.3	5.00	.....
Canton *† [1]	72	22	47.2	5.74	T.
Carrollton †	82	19	44.4	6.27	T.
Catlettsburg †	.....	.....	.....	2.34	.....
Custer †	76	24	47.0	6.50	T.
Earlington	74	22	46.9	5.84	.....
Edmonton †	75	19	46.9	3.42	0.3
Falmouth †	.....	.....	.....	3.34	T.
Fords Ferry †	74	20	45.4	6.54	T.
Frankfort †	79	22	46.6	2.73	T.
Franklin *† [1]	78	25	48.4	3.93	0.5
Georgetown	78	18	46.5	.....	.....
Greendale *[1]	75	22	44.6	2.36	T.
Greensburg *† [1]	80	20	45.2	3.73	T.
Harrods Creek †	.....	.....	.....	7.50	T.
Henderson †	75	24	47.6	9.04	T.
Leitchfield †	79	19	45.3	4.79	0.5
Lexington	.....	.....	.....	.....	T.
Lola †	72	17	46.4	6.07	.....
Louisa †	80	20	45.0	1.77	.....
Louisville	.....	.....	.....	.....	T
Marrowbone †	76	18	46.8	2.39	T.
Mount Sterling †	77	18	44.0	2.07	T.
Owenton †	76	20	44.7	4.39	T.
Paducah *a* †	.....	.....	.....	7.01	T.
Paducah *b* †	76	23	47.8	6.16	T.
Pleasure Ridge Park †	79	18	43.3	6.72	0.1
Princeton †	76	17	44.6	4.71	.....
Richmond †	78	20	47.9	2.00	T.
Russellville †	80	19	48.0	5.15	T.
Sandy Hook †	78	18	46.1	0.90	1.0
Shelbyville †	79	19	44.4	3.79	T.
South Fork † [2]	.....	.....	41.4	1.52	0.5
Springfield †	85	19	45.8	3.19	T.
Williamsburg †	.....	.....	.....	2.35	.....
Louisiana.					
Abbeville	83	32	60.8	5.35	.....
Alexandria †	80	27	55.9	4.50	.....
Amite †	83	26	58.2	1.64	.....
Ashwood †	78	27	56.4	3.08	.....
Bastrop †	81[c]	27[c]	54.1[c]	3.86	.....
Baton Rouge †	83	30	58.9	.....	.....
Calhoun †	78	25	53.6	4.23	.....
Cameron †	82	37	59.0	10.10	.....
Cheneyville †	81	26	53.7	2.22	.....
Clinton † [c]	80	30	55.8	2.05	.....
Coushatta *b* †	81	24	55.2	5.58	.....
Covington †	84	24	56.2	1.34	.....
Davis	77	23	52.5	4.64	.....
Delhi †	.....	.....	.....	3.22	.....
Donaldsonville †	84	33	60.6	1.35	.....
Elm Hall	81	29	57.6	3.92	.....
Emilie †	81	35	59.2	1.55	.....
Farmerville	79	26	52.6	5.02	.....
Franklin †	82	34	59.8	3.59	.....
Grand Coteau	76	34	58.6	4.84	.....
Hammond †	78	28	56.4	1.44	.....
Houma †	84	27	59.6	0.60	.....
Jeanerette †	84	.....	.....	4.16	.....
Lafayette †	80	30	58.8	3.84	.....
Lake Charles †	79	34	58.6	12.57	.....
Lake Providence †	85	.....	.....	2.67	.....
Lawrence †	82	38	59.2	1.25	.....
Liberty Hill	80	25	56.8	5.22	.....
Maurepas	87	28	56.6	1.66	.....
Melville †	83	26	58.6	5.00	.....
Monroe †	76	28	55.2	5.25	.....
Natchitoches †	.....	26	.....	4.17	.....
New Iberia	78	33	59.6	3.30	.....
Oak Ridge †	83	25	53.8	4.50	.....
Oberlin	80	31	60.2	.....	.....
Opelousas †	88	28	58.0	4.53	.....
Oxford †	80	23	53.6	5.35	.....
Paincourtville †	82	30	59.7	2.01	.....
Plain Dealing †	85	26	55.3	4.48	.....
Rayne †	86	30	60.0	4.73	.....
Ruston †	77	28	54.6	5.44	.....
Schriever †	86	28	58.0	1.98	.....
Shell Beach	78	39	59.9	3.64	.....
Southern University †	83	33	60.0	1.20	.....
Sugar Ex. Station †	82	35	58.6	1.36	.....
Sugartown †	75	30	58.0	4.43	.....
Thibodeaux	.....	.....	.....	2.18	.....
Toledo †	82	.....	.....	3.33	.....
Trinity †	76	37	58.9	2.59	.....
Wallace	82	36	60.0	1.98	.....
West End	.....	.....	.....	0.92	.....
White Sulphur Springs †	.....	.....	.....	3.96	.....
Maine.					
Bar Harbor	68	9	39.4	9.73	3.0
Belfast *[6]	66	12	37.9	7.29	4.0
Cornish *[1]	69	8	36.6	8.30	7.0
Eastport	.....	.....	.....	.....	2.5
Fairfield	70	7	37.5	5.47	.....
Farmington †	74	9	37.0	5.76	2.5
Flagstaff †	68	1	34.8	.....	.....
Gardiner	71	11	39.0	6.85	2.8
Houlton †	64	8	34.1	5.78	19.0
Kineo †	62	8	35.0	5.47	9.5
Lewiston	70	14	37.9	7.21	4.4
Mayfield	65	1	33.8	7.63	11.5
North Bridgton	70	10	38.3	6.58	5.5
Petit Menan *[1]	53	16	39.5	.....	.....
Portland	.....	.....	.....	.....	4.2
West Jonesport *[1]	54	11	38.5	.....	.....
Winslow	.....	.....	.....	6.52	.....
Maryland.					
Annapolis	67	27	46.2	1.87	.....
Bachmans Valley *[1]	75	20	43.4	1.80	T.
Baltimore	.....	.....	.....	.....	T.
Boettcherville *[1]	78	18	43.0	0.40	T.
Cambridge †	75	29	50.5	2.57	.....
Charlotte Hall †	78	22	46.0	2.20	T.
Cherryfields † [2]	.....	.....	46.9	2.46	.....
Chestertown †	75	25	45.8	2.22	.....
College Park	78	23	48.5	1.96	.....
Cumberland *a* †	74	22	42.8	0.34	.....
Cumberland *b*	79	24	49.4	0.43	.....
Darlington †	74	22	45.2	1.39	T.
Deer Park	70	0	37.8	0.94	1.0
Denton †	.....	.....	.....	2.60	.....
Easton †	77	25	47.3	2.56	.....
Ellicott City	76	30	49.0	0.82	T.
Fallston *[1]	75	24	45.5	1.70	T.
Frederick *a*	75	24	44.8	1.48	T.
Frederick *b*	75	21	46.0	.....	T.
Grantsville	72	14	41.0	1.00	1.0
Great Falls *[5]	76	23	45.4	2.32	.....
Green Spring Furnace	79	19	43.6	1.54	T.
Hagerstown †	77	24	45.0	2.64	.....
Hancock	81	18	46.0	1.63	.....
Jewell †	78	26	47.6	1.64	.....
Johns Hopkins Hospital	77	25	45.8	.....	.....
La Plata †	77	24	46.3	0.90	.....
Laurel	75	23	44.5	1.55	.....
Lisbon	75[c]	22[c]	43.8[c]	1.35	T.
McDonogh [4]	74	24	46.6	.....	.....
Mardela Springs †	77	26	48.2	3.51	.....
Mt. St. Marys College *[1]	74	28	44.7	1.50	.....
New Market	83	23	46.0	1.48	T.
Oakland †	69	10	37.8	1.68	3.0
Pocomoke City	77	29	52.8	2.50	.....
Princess Anne	78	23	48.3	2.07	.....
Sharpsburg	76	23	43.9	1.45	T.
Solomons †	77	28	49.6	2.51	T.
Sunnyside	73	11	39.6	1.68	2.0
Upper Marlboro †	78	20	45.9	1.00	.....
Western Port	78	17	40.6	0.70	T.
Westminster	74	21	49.0	2.14	.....
Woodstock	75	20	44.0	0.76	T.
Massachusetts.	°	°	°	*Ins.*	*Ins.*
Adams	70	12	40.6	.....	.....
Amherst	77	12	41.1	4.84	2.0
Amherst Ex. Station *b*	72	15	41.1	5.36	3.0
Andover	72	12	41.4	6.28	.....
Ashland	.....	.....	.....	6.47	.....
Attleboro	.....	.....	.....	8.98	.....
Bedford	72	14	42.4	6.64	T.
Beverly Farms	66	12	41.8	8.24	T.
Blue Hill (summit)	71	15	41.4	8.95	1.0
Blue Hill (valley)	73	16	43.3	8.48	.....
Boston *a*	.....	.....	.....	5.20	.....
Boston (W. B.)	.....	.....	.....	.....	T.
Brockton *a*	73	16	43.6	7.54	0.3
Brockton *b*	.....	.....	.....	7.56	.....
Brockton *c*	.....	.....	.....	8.09	.....
Cambridge *a*	74	14	43.1	5.94	0.3
Cambridge *b*	72	19	42.2	6.09	.....
Chestnut Hill	74	14	43.9	7.69	0.5
Clinton	.....	.....	.....	5.45	.....
Cohasset	.....	.....	.....	6.18	.....
Concord †	74	15	42.0	8.69	0.4
Dudley [1]	68*	14	42.2	4.60	.....
East Templeton *[1]	70	15	38.6	4.17	0.8
Egg Rock, Nahant	67	20	43.0	.....	.....
Fall River	68	21	45.8	5.30	.....
Fiskdale	.....	.....	.....	4.74	.....
Fitchburg *a* *[1]	69	14	39.6	5.88	0.5
Fitchburg *b*	71	12	40.6	4.53	0.8
Florida	.....	.....	.....	4.30	.....
Framingham	73	6	43.8	6.78	.....
Groton	72	12	40.2	6.49	1.0
Hadley	70	12	39.6	6.02	.....
Hingham	.....	.....	.....	7.11	.....
Hobbs Brook	.....	.....	.....	6.17	T.
Hyannis *† [1]	69	15	43.8	4.42	.....
Hyde Park *[6]	.....	14	41.1	.....	T.
Lake Cochituate	78	12	43.4	6.32	.....
Lawrence	73	15	41.7	6.86	0.5
Leeds	72	16	39.7	4.00	1.0
Leicester	70	10	38.3	2.52	T.
Leominster	.....	.....	.....	6.24	.....
Long Plain *[6]	69	16	44.9	4.07	.....
Lowell *a*	69	16	41.2	8.16	.....
Lowell *b*	73	14	41.2	.....	.....
Lowell *c*	73	18	44.0	.....	.....
Ludlow Center	68	10	37.8	5.06	0.8
Lynn *a*	66	14	39.8	5.64	.....
Lynn *b*	71	20	44.6	.....	.....
Mansfield *[1]	71	15	42.5	7.49	T.
Middleboro	73	13	43.6	4.35	.....
Milton	71	18	43.8	5.66	0.5
Monroe	66	10	36.0	6.77	4.2
Monson	72	15	42.5	4.87	1.0
Mount Nonotuck	.....	.....	.....	4.08	2.0
Mount Wachusett	.....	.....	.....	5.87	2.8
Mystic Lake	.....	.....	.....	6.50	.....
Mystic Station	.....	.....	.....	5.90	.....
Nantucket	.....	.....	.....	.....	T.
Natick *[1]	67	17	42.4	5.93	T.
New Bedford *a*	68	18	45.9	4.52	.....
New Bedford *b*	66	18	45.1	4.99	T.
North Billerica	74	19	43.8	8.99	1.0
Pittsfield	67	12	39.5	4.33	.....
Plymouth *[1]	73*	20*	46.9*	3.95	T.
Provincetown	64	24	44.9	.....	.....
Roberts Dam	.....	.....	.....	7.22	T.
Roxbury	72	20	45.4	10.44	T.
Salem	.....	.....	.....	6.67	0.5
Salisbury	.....	.....	.....	7.54	0.5
Somerset *[1]	74	18	46.6	4.42	.....
Springfield Armory	70	17	41.1	4.59	0.8
Taunton *b*	72	16	44.0	7.32	.....
Taunton *c*	70	13	43.6	5.73	.....
Turners Falls	69	18	39.6	4.41	.....
Vineyard Haven	.....	.....	.....	.....	T.
Wakefield †	72	14	42.3	9.71	T.
Waltham	.....	.....	.....	6.17	.....
Webster	.....	.....	.....	8.19	.....
Westboro †	76	13	43.2	6.79	T.
Williamstown *[1]	68	15	38.7	4.12	1.0
Winchendon	.....	.....	.....	5.46	2.0
Winchester	.....	.....	.....	6.02	.....
Winthrop	70*	12*	44.7*	4.74	.....
Woods Hole	.....	.....	.....	.....	T.
Worcester *b*	71	18	42.4	8.69	T.
Michigan.					
Adrian	73	10	36.2	6.02	2.3
Albion	68	14	36.6	4.44	7.0
Allegan	74	9	37.3	3.46	13.5
Alma	68	— 6	32.6	4.00	25.2
Alpena	.....	.....	.....	.....	19.3
Ann Arbor	68	8	36.1	3.42	4.7
Arbela	71	8	34.2	4.69	14.5
Ball Mountain	70	5	33.2	3.38	5.3
Battle Creek	69	11	36.2	3.61	7.9
Benton Harbor	70	10	38.1	5.30	11.0

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Berlin *[1]	76	4	34.6	4.46	5.0
Berrien Springs *[1]	70	11	38.9	3.65	17.0
Birmingham	68	9	35.1	2.47	2.0
Boon	64[f]	2[f]	29.9[f]	2.82	21.0
Bronson	72	12	37.2	3.10	6.0
Calumet	64	11	29.8	1.26	13.8
Charlevoix	69	13	36.5	1.87	13.8
Cheboygan	67	— 6	31.3	2.43	22.5
Clinton	73	6	36.0	5.01	3.2
Detroit					4.5
Fitchburg	72	0	34.5	4.54	12.5
Flint	73	— 2	34.4	3.59	6.1
Grand Haven					21.8
Grand Rapids	69	13	35.4	5.40	28.2
Grape	72	8	38.0	3.83	4.2
Grayling	74	— 6	30.6	2.75	25.0
Grindstone City *[10]	64	14	34.5		
Hammonds Bay *[10]	72	18	39.4		
Hanover	69	12	38.9	3.98	6.5
Harbor Springs	70	1	33.3	2.50	16.1
Harrison	58[c]	6[c]	31.4[c]	2.43	24.3
Harrisville	67	5	32.6	2.54	18.1
Hart				3.10	16.0
Hastings	67	5	34.9	4.12	14.8
Hayes	68	14	36.3	1.86	10.0
Hesperia	67	11	35.0	0.20	2.0
Highland Station	70[d]	5[d]	35.6[d]	3.84	4.5
Holland *[10]	71	19	39.1		
Howell	74	0	34.3	3.96	7.0
Ivan	66	4	32.6	2.36	22.0
Jeddo	71	7	35.3	4.33	4.2
Kalamazoo	68	10	37.4	3.32	12.0
Lansing	71	6	34.3	3.91	13.7
Lathrop *[1]	57	0	27.6	2.68	14.0
Lewiston	65	— 1	31.8	1.95	
Madison	71	12	36.4	4.95	2.3
Marquette					21.6
Mayville	68	2	32.6	3.76	17.2
Middle Island *[10]	59	16	36.9		
Mottville	70	5	37.0	3.78	8.0
Mount Pleasant	60	— 3	32.1	4.48	28.0
Muskallongee Lake *[10]	58	4	31.4		
North Manitou Island *[10]	59	19	37.1		
North Marshall	70	8	33.7	4.10	7.5
Northport	65	15	35.8	1.70	14.0
Old Mission	66	11	36.0	1.36	6.5
Olivet	68	9	35.8	3.03	9.0
Ottawa Point *[10]	69	6	37.0		
Ovid	70	0	33.1	4.30	17.0
Parkville				3.88	12.0
Pontiac	71	7	34.9	2.32	3.0
Port Huron					2.1
Rockland	70[c]	6[c]	30.6[c]	1.25	10.5
Romeo	71	6	35.5	2.10	2.0
St. Ignace	58	0	31.8	1.88	13.0
St. Johns	69	5	35.1	4.76	22.0
Sand Beach *a*	71	12	36.1	2.31	
Sand Beach *b* *[10]	70	17	36.4		
Saranac	70	1	33.4	3.75	19.5
Sault Ste Marie					11.3
Ship Canal *[10]	62	6	32.1		
Somerset	70	8	35.2	3.66	4.7
South Haven	69	9	36.6	1.67	10.5
Stanton	69	3	33.2	3.75	16.0
Sturgeon Point *[10]	61	11	34.2		
Thornville	71	5	36.2	3.74	7.0
Three Rivers		8		3.47	
Two Heart River *[10]	60	0	31.2		
Vandalia	70	9	38.6	3.49	10.6
Vermillion Point *[10]	57	2	27.7		
Ypsilanti	73	1	35.0	4.93	3.9
Minnesota.					
Ada †	59	—15	22.6	1.31	1.5
Albert Leat †	67	—19	27.1	1.83	10.0
Alexandria *a* †				0.84	3.5
Beardsley †	70	—10	25.4	1.98	18.0
Bellepiaine *[1]	50	—14	25.7	0.30	2.0
Bird Island	67	—14	28.2	1.45	10.0
Blooming Prairie †	67	—15	29.1	1.65	10.0
Bonniwell †	65	—10	28.4	0.98	4.1
Caledonia †	69	— 2	31.6	1.44	9.5
Cambridge †	65	— 6	28.6	1.35	4.6
Camden †	66	— 7	29.2	1.32	6.0
Carver † [2]			23.0	0.62	6.2
Clear Water *[1]	62	— 6	28.7	0.97	8.7
Collegeville	68	— 3	31.4	0.98	
Crookston †	50	—14	22.0	1.32	1.2
Dawson *[1]	61	—12	26.0	2.08	9.3
Duluth					5.1
Farmington †	68	—10	28.8	1.34	8.0
Fergus Falls †	62	— 8	26.4	0.74	2.2
Glencoe †	67	—16	29.2	0.71	
Glenwood †	67	— 8	27.5	0.99	2.9
Grand Meadow †	68	—11	28.8	1.81	14.5
Grand Portage †	54	—38	21.9	0.67	
Granite Falls †	67	—12	28.0	0.99	3.0
Hutchinson †	71	—15	26.9	1.17	9.7
Koochiching †	48	—21	21.8	1.79	5.0
Lake Winnibigoshish *[1]	56	— 7	24.2	0.77	4.8
Lawrence †		0		0.81	1.2
Leech Lake [1]	56[b]	—18	22.8	0.97	3.4
Long Prairie †	64	— 7	25.6	1.18	0.7
Luverne †	66	— 3	30.2	2.15	5.8
Maple Plain	67	—10	29.5	1.18	8.8
Mazeppa [1]	70[b]	—10	24.7	1.90	7.0
Milan †	69	—15	25.6	1.72	12.6
Minneapolis *a* †	67	— 7	30.2	0.94	3.7
Minneapolis *b* [1]	65[b]	— 7	29.2	0.70	2.9
Minneapolis (W. B)					2.6
Minnesota City †	71	— 3	33.2	1.20	11.0
Montevideo †	68	—10	28.4	1.25	8.5
Moorhead					6.0
Morris †	65	—10	27.3	0.95	3.0
Mount Iron †	54	—10	22.6	1.37	13.7
New London	67	— 4	29.0	0.90	2.0
New Richland *[1d]	66	—14	31.0		
New Ulm †	71	—13	31.6	1.09	11.0
Park Rapids †	59	—12	23.8	0.92	2.7
Pine River *[1]	58	— 4	25.3	1.38	0.8
Pleasant Mounds †	71	—11	30.0	1.03	7.5
Pokegama Falls [1]	56[b]	—16	23.2	1.53	3.4
Redlake †	60	—14	22.8	0.25	0.9
Redwing †				1.62	4.0
Reeds †				1.29	8.2
Rolling Green †	65	— 3	29.4	1.05	9.5
Roseau	50	—13	19.6	1.13	3.6
St. Charles †	68	— 7	30.4	2.07	11.6
St. Cloud	60	— 8	27.8	0.94	T.
St. Olaf	63	— 7	26.0	0.82	3.6
St. Paul					2.6
St. Peter †	67	—12	31.0	1.80	8.5
St. Vincent					7.1
Sandy Lake Dam [1]	58[b]	—13	25.5	1.07	T.
Sauk Center	64	— 8	26.6	1.37	3.0
Shakopee [6]	66[b]	—11	30.3	0.78	5.0
Sunrise City *[6]	64	— 6	28.2		4.0
Tower †	60	—12	24.8	2.10	6.0
Two Harbors †	59	1	32.2	1.30	2.5
Wabasha *[1]	72	0	31.5	2.39	14.5
Willmar †	66	—12	27.2	1.34	5.0
Winona	70	3	32.5	1.29	9.5
Worthington	65	— 4	29.3	1.22	6.2
Zumbrota *[1]	70	—10	30.8		
Mississippi.					
Agricultural College	75	26	53.8	1.71	
Austin †	75	25	53.5	5.16	
Batesville †	76	23	50.0	3.57	
Bay St. Louis †	75	36	58.3	1.63	
Biloxi †	74	32	55.8	0.45	
Briers †	73	26	54.1	3.66	
Brookhaven †	81	24	56.4	2.64	
Canton †	75	29	55.2	2.09	
Columbus *a* †				2.10	
Crystal Springs †				2.29	
Edwards	78	28	55.8	3.39	
Fayette †	80	25	55.7	3.94	
French Camps †	80	17	51.0	1.62	
Fulton †	78	20	51.4	1.88	
Greenville *a*	73	30	53.6	3.72	
Greenville *b* †	74	22	53.2	3.78	
Itta Bena †	77	26	53.6	3.17	
Jackson †	78	23	52.8	2.05	
Kosciusko †	79	25	53.5	2.07	
Lake †	75	28	52.5	2.62	
Leaf *[1]	80	30	57.1		
Leakesville †	80	27	56.8	0.98	
Logtown †	81	29	59.4	0.91	
Louisville †	78	23	53.3	2.56	
Mayersville	80	27	55.9	2.79	
Mico †	78	22	51.6	2.64	
Moss Point †	80	33	57.4	0.00	
Natchez †	80	29	57.4	4.95	
Okolona †	77	21	51.5	1.36	
Palo Alto †	78	27	53.0	1.37	
Pontotoc †	83	26	54.5	2.60	T.
Port Gibson †	82	25	54.4	3.43	
Rosedale †	79	22	51.1	3.74	
Stonington *[1]	84	28	56.6		
Thornton †	78	31	56.4	2.90	
Topton *[5]	78	28	57.6	1.70	
University †	78	25	52.0	4.22	
Vaiden †	80	21	55.4	2.30	
Water Valley *† [1]	85	26	52.7	3.43	
Waynesboro *a* †	76	26	50.0	1.20	
Willamsburg †				2.11	
Woodville †	79	29	56.8	4.12	
Yazoo City †	80	24	53.4	1.94	
Missouri.					
Akron				1.27	2.5
Appleton City †	76	9	43.4	4.64	4.0
Arthur †				3.01	3.0
Bethany	77	3	38.1	1.50	0.8
Birch Tree	73	13	42.8	4.95	
Bluffton	74	12	41.8	2.85	5.0
Boonville †				4.07	4.1
Brunswick	75	5	39.2	3.19	T.
Carrollton †	74	9	41.6	3.46	2.0
Columbia					6.0
Conception	74	9	40.5	0.83	T.
Cowgill *[5]	80	8	42.7	1.37	2.0
Darksville †	76	6	43.2	3.35	2.0
Downing				1.99	0.5
East Lynne *[3]		6	39.0	3.89	3.0
Edgehill *[5]	70	18	43.3	4.15	1.2
Eight Mile *[1]	72	8	41.4	4.11	3.5
Eldon *[1]	76	12	44.4	2.59	4.0
Elmira	80	2	40.2	2.49	1.0
Emma *[3]		10	41.4	2.45	2.0
Fairport				1.58	T.
Farmersville				2.44	1.0
Fayette	78	8	41.5	4.35	4.0
Fulton				3.07	5.0
Gallatin *[1]	73	6	39.0	1.78	0.8
Gayoso *[3]		22	43.4	6.97	
Glasgow	76	6	39.5	3.94	4.0
Gordonville *[3]		22	42.2	6.80	T.
Gorin *[1]	77	11	37.8	2.72	
Grove Dale	75	13	42.0	3.23	5.0
Half Way	73	13	42.6	3.04	4.0
Hannibal					4.7
Harrisonville †	76	8	40.2	3.92	2.0
Hastain	72	10	43.4	3.31	4.0
Hermann †				2.39	4.0
Houston	73	12	43.8	4.92	5.0
Houstonia (near)				3.69	2.6
Humansville	78	10	43.4	3.57	3.0
Irena				1.39	0.2
Ironton *† [1]	72	17	41.6	4.81	1.0
Jefferson City †	72	13	44.6	2.15	6.0
Kansas City					3.8
Kidder	75	3	38.8	2.42	1.7
Lamar	75	8	43.0	3.77	3.0
Lamonte				3.99	2.5
Lebanon	77	15	44.4	3.44	3.0
Lexington †	77	8	42.1	3.28	2.5
Liberty	76	8	40.7	2.39	2.5
McCune *† [1]	78	14	41.0	4.78	8.0
Marble Hill	75	16	43.1	6.09	
Marceline	74	3	39.0	3.71	3.0
Marshall †	77	5	39.8	4.01	4.0
Maryville *[4]	72	3	34.3	0.52	0.2
Mexico †	77	9	40.8	4.86	6.0
Miami				4.35	3.0
Mine La Motte †	72	19	43.8	4.38	0.5
Mineralspring	79	16	47.0	3.64	2.5
Mount Vernon	71	11	40.4	3.70	3.5
Neosho	75	11	44.1	4.61	4.5
Nevada				3.22	4.0
New Haven *[1]	74	22	45.3	2.75	9.0
New Madrid	75	21	49.4	7.06	
New Palestine †				3.11	4.0
Oakfield †	75	12	41.8	3.28	6.2
Oak Ridge *[4]		26	43.6	5.61	0.3
Oregon *a*	78	6	40.7	0.94	0.4
Oregon *b*	76	5	38.8	0.86	0.2
Osceola †				0.67	2.7
Oto				3.30	3.0
Palmyra *[5]	78	8	39.9	4.70	7.0
Phillipsburg *† [1]	73	17	42.7	2.88	3.0
Pickering *[3]	74	6	38.7	1.74	0.2
Platte River *[3]	74	10	36.6	1.46	0.5
Poplar Bluff	74	19	45.6	4.90	
Potosi	72	6	39.4	3.80	3.0
Princeton *[1]	76	3	39.9	1.83	2.0
St. Charles	78	14	43.5	3.34	6.2
St. Joseph †				1.01	T.
St. Louis	76	6	40.9	3.35	6.0
St. Louis (W. B)					4.0
Sarcoxie *[3]	78	17	41.0	3.64	3.9
Shelbina				3.40	5.0
Sikeston	75	23	48.0	6.32	
Springfield					6.0
Steffenville				3.19	3.8
Stellada †	77	4	41.7	3.14	3.0
Sublett	74	2	37.8	1.70	1.0
Trenton	71	6	38.6		
Unionville †	81	— 4	35.7	1.51	2.2
Vermont *† [1]	74	10	40.9	4.68	5.0
Virgil City				3.20	3.0
Warrensburg *[1]	72	13	42.0	3.89	4.0
Warrenton	72	12	41.6	3.20	10.0
Wheatland				4.17	4.0
Willow Springs	82	6	46.2	4.21	4.5
Zeitonia *[1]	71	20	41.6	5.85	0.6
Montana.					
Bigtimber †	68	— 6	35.2	1.34	20.5
Billings †	72	— 2	35.4	1.30	12.0
Bozeman †	54	— 6	28.9	2.22	22.2

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Montana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Butte†	50	— 4	29.2	0.31	6.9
Choteau†	70	—11	35.6	1.40	14.0
Cokedale†	60	— 3	31.6	2.96	44.0
Columbia Falls†	56	3	30.5	1.73	7.4
Deer Lodge City†	63	— 8	30.0	0.02	T.
Dillon†	60	—13	28.2	0.80	8.0
Fort Benton†	65	—16	32.2	0.70	7.0
Fort Custer†	69	— 7	33.6	1.61	9.5
Fort Keogh†	66	—12	27.9	1.10	11.0
Fort Logan†	59	— 5	30.4	0.46	1.8
Fort Missoula	62	2	31.2	0.58	1.0
Glasgow†	62	—19	20.7	0.98	1.5
Glendive†	66	—10	26.6	1.30	13.0
Grantsdale†	64	6	33.4	0.16	.....
Great Falls†	74	— 2	37.8	0.59	9.7
Havre	.....	.....	.....	.....	3.5
Helena	.....	.....	.....	.....	6.7
Hogan†	62	—13	32.3	1.00	10.0
Kipp†	60	—18	28.8	0.40	3.7
Libby†	73	2	36.2	1.04	5.0
Livingston†	64	— 3	33.3	1.97	19.7
Manhattan†	63	— 9	30.2	0.31	3.1
Martinsdale†	58	— 7	33.0	0.79	7.9
Marysville†	54	— 5	29.8	1.01	21.0
Miles City	.....	.....	.....	.....	7.6
Radersburg†	62	4	34.5	T.	T.
Red Lodge†	72	—10	30.0	3.00	30.0
Sun River†	63	—12	32.2	0.49	5.0
Toston	77	— 4	31.7	0.70	7.0
Troy†	62	9	35.2	1.52	T.
Utica†	62	—13	32.3	0.80	8.0
Virginia City†	65	— 1	28.4	0.76	7.5
White Sulphur Springs†	62	— 6	31.0	0.90	11.0
Wibaux†	70	— 8	30.0	0.80	8.0
Yale†	63	— 9	31.7	0.60	6.0
Nebraska.					
Agee*1	68	— 3	32.6	1.06	6.2
Alliance	.....	.....	.....	0.82	5.8
Amelia*1	70	4	35.6	0.79	7.9
Ansley†	70	— 5	33.8	0.91	3.0
Arapaho	.....	.....	.....	0.82	4.0
Arborville*1	75	— 4	36.6	0.93	2.0
Ashland *a*†	74	3	36.7	0.82	2.0
Ashland *b*†1	74	3	39.2	1.09	1.8
Ashton	69	—10	34.3	1.08	4.5
Auburn*†1	78	— 1	39.1	1.33	1.5
Aurora*1	78	4	36.7	0.89	0.2
Bassett	73	—10	27.8	1.54	10.0
Beatrice†	74	0	38.3	1.25	2.0
Beaver City	70	— 3	38.6	1.22	4.5
Benkelman*1	64	2	35.8	1.17	4.0
Blue Hill*1	72	1	37.8	0.94	1.1
Bratton*1	74	2	36.5	1.23	1.0
Brokenbow*1	71	— 2	34.7	0.50	5.0
Burchard*1	75	3	40.6	1.09	T.
Burwell	.....	.....	.....	1.20	7.0
Callaway†	60	—10	34.6	0.90	5.5
Central City*5	66	1	40.4	1.06	5.5
Chester*1	68	0	36.0	0.98	2.0
Columbus†	71	— 3	36.7	0.64	3.5
Cornlea	.....	.....	.....	1.22	3.0
Creighton†	70	— 7	32.4	2.95	5.0
Crete	73	— 1	37.4	0.91	0.5
Culbertson	.....	.....	.....	0.85	5.5
Curtis *a*†	75	—12	35.3	0.75	4.5
Curtis *b*†1	80	—10	38.8	0.40	4.0
David City*†1	73	— 3	36.2	0.95	3.0
Divide*†1	66	4	33.5	0.73	7.5
Dunning*1	67	— 2	34.2	1.57	12.0
Edgar*1	70	2	36.1	0.78	1.0
Ericson†	.....	.....	.....	0.40	4.0
Ewing†	.....	.....	.....	0.69	4.5
Fairbury†	73	1	37.4	1.16	1.0
Fairmont*1	72	0	38.3	1.11	2.0
Fort Robinson	67	0	32.4	0.75	7.5
Franklin†	72	— 6	35.6	0.80	2.0
Geneva†	71	— 3	37.0	1.29	3.0
Genoa†	73	— 5	34.7	1.06	4.6
Gering†	74	—15	32.0	0.61	6.1
Gibbon	71	— 8	36.1	1.00	4.0
Gothenburg	74	— 6	40.2	1.07	10.0
Grand Island *a*†1	72	5	38.3	1.07	2.5
Grand Island *b*	72	— 8	35.1	1.03	4.1
Greeley	.....	.....	.....	0.50	3.0
Haigler*1	74	— 9	35.1	1.00	6.0
Hartington†1	70	— 5	32.4	1.04	6.0
Harvard*1	72	— 6	35.6	1.48	2.5
Hastings*1	68	— 2	33.4	0.65	2.2
Hayes Center†	.....	.....	.....	1.26	4.0
Hay Springs†	69	— 4	29.3	0.69	4.5
Hebron†	76	— 1	37.8	0.89	1.0
Hickman*1	82	0	38.2	1.44	2.0
Imperial *a*†	75	— 8	35.5	0.75	5.0
Indianola*5	78	— 4	36.7	0.40	4.0
Kearney*1	72	—10	36.6	0.89	.....
Kennedy†	70	— 3	31.4	0.89	5.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Kimball†	79	— 6	33.1	0.40	4.0
Kirkwood*1	70	0	31.2	1.18	5.0
Lexington†	68	—10	32.2	2.30	5.0
Lincoln	73	1	37.8	0.79	1.8
Lynch*†1	74	—13	32.9	0.75	4.0
Lyons	.....	.....	.....	1.40	4.0
McCook*1	56	2	33.6	1.00	.....
McCool	.....	.....	.....	1.00	.....
Madison*1	70	— 2	31.7	1.23	4.2
Madrid*†5	70	— 3	34.2	0.70	7.0
Marquette*	72	— 1	.....	1.11	3.2
Milford	.....	.....	.....	1.02	2.4
Minden*1	72	— 5	35.8	0.92	3.8
Nebraska City *b*†1	72	7	39.3	0.82	1.0
Nemaha City*1	75	0	36.4	1.30	1.0
Nesbit†	72	8	40.3	1.14	9.0
Norfolk†	67	— 4	33.8	0.71	.....
North Loup†	60	—16	33.6	1.16	13.0
North Platte	.....	.....	.....	.....	8.4
Oakdale†	70	—10	32.4	0.79	3.9
Odell*5	70	0	38.3	1.01	1.5
Omaha*1	68°	2	33.3°	1.16	4.0
Omaha (W. B.)	.....	.....	.....	.....	3.6
O'Neill*1	70	—10	33.1	0.55	5.5
Ord	70	— 8	35.2	1.51	4.8
Osceola	.....	.....	.....	0.85	2.0
Ough†	.....	.....	.....	0.70	4.0
Palmer *a*†1	72	—10	31.3	0.80	3.0
Palmer *b*	.....	.....	.....	0.85	3.0
Plattsmouth *a*†	.....	.....	.....	1.60	3.0
Plattsmouth *b*†1	72	2	41.4	1.53	3.0
Potter*1	74	0	33.5	0.35	3.5
Ravenna *a*	72	— 8	35.4	1.14	6.5
Ravenna *b*†1	65	— 2	37.7	0.75	3.2
Red Cloud *a*	.....	.....	.....	0.75	1.5
Red Cloud *b*†1	70	— 2	38.6	0.94	3.0
Republican*1	68	— 4	38.6	1.00	2.0
Rulo*1	78	8	41.8	0.68	T.
St. Paul	72	— 6	36.5	0.79	2.8
Salem*1	78	12	40.4	1.42	0.2
Santee Agency†	64	— 7	33.7	1.16	5.1
Schuyler	.....	.....	.....	0.62	2.1
Seneca*1	62	2	32.0	0.41	4.2
Seward*5	65	0	39.4	1.38	2.0
Spencer	.....	.....	.....	1.08	.....
Springfield*1	76	— 2	36.2	1.20	3.0
Springview	74	—13	32.0	1.15	7.9
Stanton*1	71	— 1	33.1	0.83	3.8
State Farm	77	— 2	38.6	0.51	2.5
Strang*1	72	0	39.8	1.13	2.1
Stromsburg	.....	.....	.....	0.75	.....
Superior*5	78	2	37.2	1.09	0.8
Sutton	73	— 6	35.8	1.28	3.8
Syracuse	.....	.....	.....	0.94	.....
Tecumseh *a*†	74	0	36.8	1.06	2.0
Tecumseh *b*	.....	.....	.....	0.99	1.0
Tekamah	72	— 5	34.9	1.30	4.0
Thedford*1	78	—10	33.0	0.86	8.6
Turlington†	75	— 6	34.8	1.11	1.7
Wakefield	.....	.....	.....	0.93	4.1
Weeping Water*1	72	— 8	34.2	1.11	3.5
Weston*5	78f	6f	35.2f	0.75	4.0
Whitman	.....	.....	.....	0.40	4.0
Wilber*1	76	2	40.4	1.02	1.0
Wilcox	.....	.....	.....	0.91	6.0
Wilsonville*1	70	— 4	37.3	1.05	4.0
Woodlawn	.....	.....	.....	0.71	.....
York*1	68	2	36.8	1.21	2.5
Nevada.					
Austin	56	4	32.7	1.04	10.5
Battle Mountain*1	65	14	38.0	0.37	2.8
Belmont	50	3	27.4	0.41	4.5
Beowawe*1	63	4	32.6	0.15	1.5
Candelaria	78	15	42.6	0.10	1.0
Carlin*1	70	— 6	28.2	0.35	3.5
Carson City	72	12	37.8	0.56	3.5
Carson City (W. B.)	.....	.....	.....	.....	6.0
Cloverdale	.....	.....	.....	0.50	3.0
Clover Valley†	.....	.....	.....	1.32	10.0
Cortez†	.....	.....	.....	1.90	19.0
Cranes Ranch	.....	.....	.....	1.05	8.0
Currant	.....	.....	.....	1.42	7.9
Darrough Ranch	.....	.....	.....	1.96	6.5
Downeyville	76	12	42.8	0.57	4.0
Elko*5	65	0	30.6	0.60	6.0
Elko (near)	58	— 4	30.4	0.51	5.1
Ely	62	— 7	30.0	1.60	16.0
Empire Ranch†	60	—17	27.8	0.79	8.5
Fenelon*1	59	0	26.2	1.55	15.5
Genoa	70	13	44.0	0.53	0.3
Golconda*1	62	9	32.9	0.07	0.2
Halleck*1	60	—10	27.5	0.75	7.5
Hamilton	76	— 7	32.7	1.68	15.5
Hawthorne *a*5	62	24	41.8	1.58	7.0
Hawthorne *b*	67	15	40.8	0.98	7.0
Hot Springs*1	66	10	37.7	0.00	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Nevada—Cont'd.	°	°	°	*Ins.*	*Ins.*
Humboldt*1	68	10	39.0	T.	T.
Las Vegas	71	24	45.0	0.12	
Lewers Ranch	69	14	40.2	1.01	4.1
Lovelock*1	70	16	44.1	0.00	
Mill City*1	70	10	35.4	.....	T.
Osceola†	68	12	35.2	0.56	11.0
Palisade*1	65	3	34.3	0.70	6.0
Palmetto	70	0	34.8	0.45	4.5
Reno*5	68	19	40.0	0.20	2.0
Reno State University	66	13	38.0	0.17	0.5
Ruby Valley†	.....	.....	.....	0.61	7.3
St. Clair	62	11	37.0	0.21	0.5
St. Thomas	80	19	51.6	0.43	
San Antonio	65d	6d	34.2d	0.30	1.5
Silverpeak	80d	10d	41.0d	0.33	
Stofiel	62	— 5	28.6	1.17	11.5
Sunnyside	70	2	34.6	1.05	4.1
Tecoma*1	60	12	31.7	0.35	3.5
Toano*1	58	2	29.6	0.20	2.0
Tuscarora	60	25	42.8	0.71	6.6
Tybo	60	5	33.7	0.34	5.0
Verdi*1	68	18	38.8	0.76	2.5
Wadsworth*1	60	14	31.7	0.45	4.0
Wells	60	— 7	32.4	0.53	8.0
Winnemucca	.....	.....	.....	.....	1.8
Yerington	63	9	35.6	0.50	2.0
New Hampshire.					
Alstead*6	64	8	35.9	5.30	4.0
Belmont	.....	.....	.....	5.77	.....
Berlin Mills	68	0	34.6	5.38	14.5
Bethlehem	68	— 3	34.9	5.98	7.0
Brookline*1	72	16	41.2	6.51	1.0
Concord	72	13	39.0	5.50	4.0
Dublin	67	6	38.4	6.54	6.0
Durham	72	14	39.6	7.35	1.0
Grafton†	72	5	36.4	5.49	7.0
Hanover	69	4	36.9	5.17	4.8
Keene	71	8	38.1	5.34	3.5
Lakeport	.....	.....	.....	4.35	.....
Mine Falls	.....	.....	.....	6.10	.....
Nashua	72	13	39.6	5.93	2.2
Newton	72	10	41.2	6.11	T.
North Conway	72	9	38.1	6.23	8.5
Pennichuck Station	.....	.....	.....	6.59	.....
Peterboro	68	6	37.7	6.10	5.2
Plymouth	69	8	35.1	5.26	1.2
Sanbornton†	69	7	37.4	5.58	7.0
Stratford	72	0	36.7	5.64	10.0
Warner	.....	.....	.....	5.05	6.0
Weirs Bridge	.....	.....	.....	4.78	.....
West Milan	70	— 3	34.4	5.64	.....
Wolfboro	.....	.....	.....	5.64	.....
New Jersey.					
Allaire	78	16	45.6	.....	.....
Asbury Park	68e	21e	45.2e	2.86	.....
Barnegat	76	19	49.0	3.21	
Bayonne	74	21	45.5	4.60	T.
Beachhaven	67	26	48.8	3.61	
Belvidere	71	17	43.5	2.31	T.
Beverly†	78	20	46.6	2.55	
Billingsport	76	25	45.0	2.88	
Blairstown	70	22	47.1	2.38	T.
Boonton	68	17	44.0	3.66	T.
Bridgeton	78	27	48.4	2.43	
Camden	75	23	45.3	2.46	
Cape May	72	26	49.2	2.31	
Cape May C. H.†	75	24	48.3	2.56	
Charlotteburg	70	12	42.2	4.86	
Chester	67	17	41.9	2.53	.....
Deckertown	72	15	44.0	2.62	
Dover	70	14	42.1	2.47	
Egg Harbor City	77e	17e	46.6e	2.73	
Elizabeth†	72	20	44.8	3.33	
Englewood	70	18	44.6	4.38	T.
Franklin Furnace	68	23	45.2	2.13	T.
Freehold	76	20	45.8	5.10	
Friesburg	.....	.....	.....	2.97	
Gillette	71	18	43.2	2.75	
Hammonton	.....	.....	.....	3.95	
Hanover	70	19	43.8	3.40	
Hightstown	76	23	45.8	3.63	
Imlaystown	76	22	47.2	2.74	
Junction	.....	.....	.....	1.56	
Lambertville	74	21	45.7	1.75	
Millville	79	20	48.3	2.51	
Moorestown	78	24	46.4	2.87	
Newark *a*	70	25	45.3	3.84	.....
Newark *b*†	72	24	45.6	3.74	T.
New Brunswick *a*	73	20	46.6	3.41	
New Brunswick *b*	73	20	44.8	3.55	
Newton	69	16	43.4	2.06	
Ocean City	63	25	45.7	3.87	
Oceanic	76	28	48.0	3.25	
Paterson	73	21	47.0	3.27	T.
Perth Amboy	73	23	45.4	3.16	
Plainfield	72	19	45.6	3.27	T.

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean	Precipitation. Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
Rancocas*	76	25	.....	2.44	
Readington*[6]	72	26	49.3	.....	
River Vale	71	15	44.2	3.74	
Somerville	73	13	45.3	3.32	T.
South Orange	71	20	44.3	3.55	T.
Toms River	79	16	46.5	4.57	
Trenton	78	26	48.8	3.82	
Vineland	79	18	47.4	3.36	
Whiting	80	20	47.8	2.86	
Woodbine	76	20	46.4	2.89	
New Mexico.					
Albert†	72	12	42.1	0.99	4.2
Albuquerque†	62	16	36.6	0.85	5.1
Alma†	68	18	43.4	2.65	
Aztec†	66	11	36.0	2.06	1.5
Bernalillo†	66	19	40.8	1.20	....
Chama†	74	— 5	34.8	3.45	34.5
Deming*[6]	78	28	57.4	0.90	
Downs Ranch†	70	23	47.0	0.66	3.5
East Las Vegas†	68	— 2	37.2	0.88	7.9
Eddy†	77	....	.....	0.56	
Engle†	69	19	43.6	0.70	T.
Espanola†	61	12	36.8	0.96	6.0
Estalina Springs†	.....	.....	.....	1.44	9.0
Fort Bayard	73	20	43.6	1.40	1.0
Fort Stanton†	65	9	37.0	1.24	8.8
Fort Union†	76	1	39.4	0.38	5.5
Fort Wingate	70	0	38.5	3.60	26.5
Galisteo†	67	8	38.8	2.10	5.0
Gallinas Spring†	70	4	39.1	0.70	3.0
Gila	70	25	46.2	2.19	
Hillsboro†	69	16	43.4	0.49	T.
Las Cruces†	73	19	45.5	0.45	
Lordsburg*[8]	64	28	46.7	1.38	
Los Lunas†	70	14	40.2	1.40	
Monero†	57	3	30.3	1.52	6.5
Ocate†	60	1	35.3	0.75	7.0
Olio†	60	2	31.4	0.51	4.0
Pecos	.....	.....	.....	2.08	
Puerto de Luna†	75	10	45.0	0.83	3.0
Raton†	70	3	35.5	0.27	3.4
Rincon†	72	21	46.8	0.54	
Roswell†	80	20	46.5	0.88	
San Marcial†	68	21	43.5	1.16	3.0
Santa Fe	.....	.....	.....	.....	8.4
Taos†	72	4	40.0	1.40	5.0
New York.					
Addison	73	18	41.2	2.44	0.5
Akron	.....	....	.....	3.72	
Albany	.....	....	.....	.....	2.2
Alfred	69	11	39.0	3.34	4.1
Angelica†	68	14	36.8	3.46	4.5
Appleton	68	17	39.3	3.47	3.5
Arcade	67	11	37.2	2.77	3.5
Atlanta	.....	.....	.....	2.87	
Avon	73	12	38.4	3.58	1.1
Baldwinsville	69	12	40.0	3.13	2.0
Bedford	76	16	44.4	3.80	0.2
Big Sandy*[10]	65	11	38.4	.....	
Binghamton†	71	5	40.5	2.94	T.
Bloomville	69	10	38.0	6.46	0.2
Bolivar	.....	.....	.....	4.02	
Boyds Corners	.....	.....	.....	2.98	
Brentwood	70	13	42.6	5.20	T.
Brookfield	72	12	39.8	3.11	3.0
Brooklyn	72	24	45.0	4.79	T.
Buffalo	.....	.....	.....	.....	2.1
Canton†	64	— 2	34.8	5.42	
Carmel	70	16	42.7	4.95	
Charlotte*[10]	68	15	38.5	.....	
Cherry Creek	.....	.....	.....	5.92	
Cooperstown†	70	10	37.7	3.65	1.5
Cortland	70	6	38.9	3.06	.....
De Kalb Junction	.....	.....	.....	5.34	
Demster	.....	.....	.....	4.08	
Easton	.....	.....	.....	4.93	
Elmira†	72	21	42.0	1.25	
Fleming	69	14	40.6	2.90	1.0
Fort Niagara†	70	18	39.4	2.89	.....
Friendship	70	13	38.2	3.44	2.3
Glens Falls	73	9	36.6	4.82	2.0
Gloversville	70	7	36.8	4.83	3.7
Hamilton	70	7	39.9	2.62	3.0
Haskinville	.....	.....	.....	3.35	
Honeymead Brook	68	14	40.4	3.61	1.0
Humphrey†	72	16	40.1	4.47	3.3
Ithaca	69	15	40.8	2.69	0.8
Jamestown[b]	67	5	38.2	4.78	10.0
Kings Station	.....	.....	.....	3.23	
Lebanon Springs	70	5	39.0	4.80	2.5
Le Roy	70	14	37.1	2.89	6.5
Lowville	64	1	37.0	4.64	5.0
Lyons	67	17	41.0	2.76	5.0
Madison Barracks†	68	7	39.4	4.12	1.3
Malone	63	2	35.0	4.84	13.9
Manhattan Beach†	.....	23	.....	4.49	
Middletown	75	22	42.6	5.65	T.
Mount Morris	70	12	38.6	2.60	2.0
Newark Valley	.....	.....	.....	2.49	
New Lisbon	70	6	37.1	2.98	2.0
New York	.....	.....	.....	.....	T.
North Hammond†	60	10	37.1	5.48	1.0
Number Four†	63	0	34.4	6.39	8.5
Ogdensburg	66	6	37.0	.....	6.5
Oneonta	72	12	40.6	3.76	.....
Oswego	.....	.....	.....	.....	2.5
Oxford	73	9	38.4	3.95	2.0
Palermo†	65	12	37.7	2.83	2.2
Perry City	71	10	37.6	4.16	3.9
Phœnix	.....	.....	.....	3.83	
Pine City	.....	.....	.....	2.07	
Pittsford	73	15	40.2	2.87	1.0
Plattsburg Barracks	66	4	35.7	5.13	.....
Port Jervis	68	13	40.7	2.90	1.0
Potsdam	63	1	34.8	1.67	
Poughkeepsie	72	13	41.5	2.86	3.1
Remsen	62	10	35.6	5.85	.....
Ridgeway	.....	.....	.....	3.53	
Rochester	.....	.....	.....	.....	5.9
Rome	68	15	38.4	4.32	
Romulus	70	14	40.5	3.80	
Rose†	.....	.....	.....	3.80	
Saranac Lake	62	3	33.0	4.43	5.0
Setauket†	68	25	46.2	5.40	.....
Sherwood	.....	.....	.....	2.90	
Skaneateles	.....	.....	.....	3.46	
South Canisteo	73	15	39.2	3.39	3.5
Southeast Reservoir	.....	.....	.....	5.06	
South Kortright†	.....	.....	.....	3.70	
Turin	62	5	35.0	5.27	10.0
Tyrone	.....	.....	.....	2.99	
Varysburg	71	10	39.4	3.07	1.0
Victor	72	13	39.4	.....	.....
Wappingers Falls	69	18	42.4	4.00	1.5
Warwick	.....	.....	.....	3.38	
Waverly†	73	12	40.2	1.80	0.3
Wedgwood	69	11	38.8	3.37	3.0
West Point†	69	20	41.8	5.58	
Willets Point	68	23	44.7	3.16	
North Carolina.					
Asheville†	75	23	49.4	2.78	
Bakersville†	75	19	47.4	.....	
Bryson City†	.....	.....	.....	2.42	
Chapel Hill†	79	22	50.0	4.67	
Currituck Inlet†	.....	.....	.....	2.88	
Experimental Farm	77	26	51.0	3.65	
Fair Bluff†	.....	.....	.....	2.61	
Falkland*[1]	81	27	53.3	2.77	
Fayetteville†	78	28	53.2	2.21	
Flat Rock	73[c]	18[c]	46.6[c]	3.86	1.0
Greensboro†	76	26	50.8	3.65	
Greenville	.....	.....	.....	2.37	
Henderson†	79	25	51.4	4.82	
Highlands	64	15	44.4	4.15	T.
Horse Cove†	67	21	48.0	3.75	T.
Lenoir*†[1]	75	23	48.0	2.22	
Linville†	65	15	41.6	2.53	1.0
Littleton†	79	25	50.1	1.91	
Louisburg†	80	23	50.2	2.40	
Lumberton†	78	24	54.9	2.02	
Lynn*†[3]	74	.....	47.6	3.36	
Mocksville†	74	22	51.6	3.11	T.
Moncure†	79	25	51.2	3.25	T.
Morganton*†[1]	75	25	49.4	1.24	
Mount Airy†[4]	74	22	49.6	2.66	
Mount Pleasant	77	19	51.0	2.18	
Murphy†	.....	.....	.....	2.73	T.
Newbern†	84	27	57.0	4.94	
Oak Ridge†	75	24	49.6	2.43	T.
Pantego	.....	.....	.....	3.74	
Pittsboro	77	24	47.0	6.57	
Raleigh*†[1]	79	29	53.5	2.60	.....
Raleigh (W. B.)	.....	.....	.....	.....	T.
Rockingham†	80	24	52.7	2.62	
Roxboro†	76	23	49.4	3.33	
Rutherfordton†	64	26	48.1	2.73	
Salem†	75	21	47.9	2.25	
Salisbury	76	23	50.0	2.75	
Saxon†	75	21	48.2	2.38	T.
Selma	81	26	51.9	3.90	
Settle	.....	.....	.....	3.36	T.
Skyuka	74	25	46.8	3.17	
Sloan†	81*	25*	53.4*	2.83	
Soapstone Mount†	79	18	48.7	2.71	T.
Southern Pines†[1]	74	35*	54.6	0.55	
Southport†	80	27	57.0	3.90	
Tarboro	81	23	52.4	2.26	
Waynesville†	73	20	46.8	2.30	2.5
Weldon†	80	28	51.1	2.61	T.
Willeyton	81	25	52.2	3.62	
North Dakota.					
Amenia	55	—12	22.2	1.73	1.5
Ashley†	56[d]	—13[d]	22.0[d]	1.22	12.2
Berlin†	54	—19	22.0	2.03	8.3
Bismarck	.....	.....	.....	.....	16.2
Churchs Ferry	44	—13	17.4	0.65	6.5
Coal Harbor†	58	— 9	19.2	1.00	10.0
Dickinson†	62	—13	21.6	0.34	3.4
Ellendale	60	—12	22.2	0.97	9.7
Falconer	58	—16[e]	17.6[e]	0.90	9.0
Fargo†	62	—15	22.2	1.16	0.1
Forman†	53	—22	21.4	1.80	8.0
Fort Berthold†	63	—15	23.6	1.80	18.0
Fort Yates†	59	— 5	24.3	0.70	4.0
Gallatin†	57	—22	19.4	1.09	3.6
Grafton†	45	—12	19.3	0.30	3.0
Jamestown†	58	—12	23.8	1.60	16.0
Kelso†[b]	48	—12	21.4	1.14	11.4
Lakota†	46	—18	18.4	.....	.....
Larimore†	49	—16	19.2	0.69	6.9
McKinney	55	—18	18.0	0.87	9.2
Milton†	47	—19	16.8	0.60	6.0
Napoleon†	57	—15	22.2	1.02	8.5
New England City†	76	— 6	27.4	1.10	11.0
Oakdale†	57	— 9	24.4	0.78	7.8
Portal†	52	—19	17.0	0.80	8.0
Power†	59	—16	22.2	1.31	11.8
St. John†[c]	50	—13	14.3	0.50	5.0
Sheyenne	45	—16	18.0	0.90	3.7
Steele†[d]	56	—25	19.2	1.66	13.2
University†	46	—12	22.4	1.58	6.2
Wild Rice†[3]	.....	.....	21.8	1.86	11.0
Williston	.....	.....	.....	.....	23.1
Willow City†	53	—30	15.4	1.10	11.0
Woodbridge†	42	—18	15.4	0.09	0.9
Ohio.					
Akron	72	16	40.8	4.46	1.8
Annapolis	73	17	42.2	2.38	T.
Ashland	71	13	39.0	4.41	1.0
Ashtabula	70	22	41.9	4.63	3.0
Atwater	.....	.....	.....	3.56	1.5
Auburn	71	8	36.6	5.33	3.0
Bangorville	73	17	40.2	2.78	1.5
Bellefontaine	76	8	39.2	5.85	1.0
Bement*[1]	68	15	35.9	7.78	2.0
Benton Ridge	75	14	39.1	4.97	2.2
Bethany	78	16	40.7	4.74	
Bigprairie	74	14	41.0	5.02	1.5
Binola	73	17	41.4	4.82	5.0
Bissells	74	14	39.8	4.59	2.9
Bladensburg	75	16	40.0	4.34	T.
Bloomingburg	82	15	42.8	4.89	T.
Bowling Green	74	11	38.3	5.87	4.0
Bucyrus	76	12	38.8	4.30	2.3
Cambridge	74	17	39.8	4.05	
Camp Dennison	79	30	43.0	5.10	T.
Canal Dover	75	18	40.6	3.46	0.5
Canton†	73	17	41.1	3.59	0.8
Cardington	72	18	41.0	5.65	1.0
Carrollton	70	17	41.6	3.25	T.
Cedarville	74	24	45.8	5.44	1.0
Celina	73	17	42.4	5.04	T.
Cherry Fork	80	13	42.4	2.56	
Cincinnati	.....	.....	.....	.....	0.2
Circleville*a*†	.....	.....	.....	3.62	T.
Circleville*b*	79	18	43.0	3.36	T.
Clarksville	79	15	42.6	5.06	0.5
Cleveland	73	20	41.8	4.71	3.8
Cleveland (W. B.)	.....	.....	.....	.....	1.3
Clifton	80	14	41.8	5.14	0.5
Coalton	80	12	42.8	1.47	T.
Colebrook	72	16	40.1	4.13	1.0
Columbus	.....	.....	.....	.....	0.1
Dayton*a*	76	18	42.6	5.32	T.
Dayton*b*†	.....	.....	.....	5.93	T.
Defiance	77°	13°	36.6°	4.56	2.2
Demos	73	20	43.6	1.31	4.2
Dupont	75	13	39.1	3.10	4.5
Ellsworth	74	17	40.6	3.23	0.6
Elyria	75	18	41.4	4.60	1.5
Fairport Harbor*[10]	72	22	42.3	.....	
Fayetteville	77	16	42.0	40.9	1.0
Findlay	74	13	39.6	5.67	2.0
Fostoria	73	14	39.1	4.73	2.0
Frankfort	77	16	42.4	2.93	
Garrettsville	72	16	39.4	4.74	3.5
Granville	77	15	39.9	5.44	0.5
Gratiot	78	16	42.3	3.83	0.8
Greenfield	72*	21*	42.2*	3.60	T.
Greenhill	75	16	39.9	3.27	0.7
Greenville	71	15	39.9	5.14	T.
Hackney	75	16	44.8	1.98	
Hanging Rock	84	17	44.4	1.87	
Hebbardsville	83	19	46.2	1.16	T.
Hedges	75	9	37.4	5.76	2.0
Hillhouse	73	15	39.9	5.11	3.5
Hillsboro	85	12	42.6	2.95	T.
Hiram	70	15	38.7	5.02	5.0

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Hudson	76	15	39.7	5.57	3.0
Jacksonboro	78	16	41.8	5.35	
Kenton†	79	15	40.8	5.87	1.2
Killbuck	74	16	40.8	4.31	
Lancaster	74	16	41.2	4.30	0.3
Leipsic	75	13	38.0	5.44	1.5
Levering	75	12	36.9	4.39	.....
Logan	78	10	43.0	2.71	1.0
Lordstown	71	17	38.8	3.01	1.8
McArthur	78	14	42.4	1.52	
McConnelsville	78	15	45.2	2.17	1.0
Marietta *a*†	.....	.....	.....	2.13	T.
Marietta *b*	78	22	43.9	1.98	0.1
Marion	77	17	41.4	3.70	0.2
Medina	75	15	40.0	4.87	2.1
Milfordton	76	14	39.6	3.73	T.
Milligan	79	8	42.4	2.18	T.
Millport	73	19	44.0	3.31	3.9
Montpelier	74	12	36.4	4.74	3.0
Napoleon	72	14	37.2	3.24	3.8
New Alexandria	73	19	43.4	2.41	T.
New Berlin	73	15	39.8	3.40	T.
New Bremen	74	11	40.5	5.77	3.0
New Comerstown	73	18	41.0	3.30	T.
New Holland	75	16	41.0	4.16	0.2
New Moscow	.....	.....	.....	3.31	
New Paris	77	13	43.2	5.62	T.
New Waterford	.....	.....	.....	3.50	T.
North Lewisburg	77	12	39.4	6.15	T.
North Royalton	71	13	40.6	4.50	1.0
Norwalk	76	5	40.4	5.55	1.5
Oberlin	73	10	38.8	6.35	2.5
Ohio State University	77	15	41.0	4.38	0.1
Orangeville	70	15	39.1	3.25	2.0
Ottawa	74	12	39.0	5.54	2.0
Pataskala	78	14	41.0	5.85	0.4
Peoli	74	18	42.0	3.51	1.0
Philo	75	16	42.9	2.70	T.
Plattsburg	78	14	41.5	4.75	T.
Portsmouth *a*†	.....	.....	.....	2.21	.....
Portsmouth *b*	84	23	46.4	1.73	T.
Richwood	.....	.....	.....	5.25	0.3
Ridgeville Corners	74	13	37.4	4.84	2.0
Ripley	76	19	44.3	2.61	T.
Rittman	73	12	38.2	3.93	0.5
Rockyridge	75	8	40.0	5.64	2.2
Rosewood	75	12	39.9	5.35	2.4
Sandusky	.....	.....	.....	.....	1.1
Sharon Center	75	18	42.8	4.06	
Shenandoah	76	8	39.0	4.68	1.8
Sidney *b*	74	14	39.8	5.59	0.2
Sinking Spring	75	12	43.0	2.63	T.
Springboro	.....	.....	.....	4.98	1.0
Steuben	.....	.....	.....	4.85	1.8
Stoutsville	.....	.....	.....	2.91	
Sylvania	76	7	35.8	5.40	3.5
Thurman	80	20	42.7	0.87	
Tiffin†	73	12	40.9	5.72	3.2
Toledo	.....	.....	.....	.....	3.7
Upper Sandusky	73	17	40.8	5.72	2.5
Vanceburg	79	23	46.4	1.93	T.
Van Wert	74	11	38.7	5.17	3.0
Vermilion	74	12	39.8	5.37	7.0
Vickery	75	11	39.7	5.33	3.7
Walnut	.....	.....	.....	4.40	T.
Warren	73	18	40.0	3.43	T.
Warsaw	76[4]	11[4]	38.3[4]	3.24	T.
Wauseon	73	13	37.8	6.30	4.6
Waverly	80	16	43.2	1.65	T.
Waynesville	76	19	42.3	5.04	T.
Wellington	75	15	42.6	4.75	2.0
Westerville	75	16	42.0	4.36	1.0
Willoughby	.....	.....	.....	4.53	1.0
Wooster *a*	72	18	40.4	4.21	0.5
Youngstown	70	19	39.9	3.39	T
Zanesville†	.....	.....	.....	3.49	
Oklahoma.					
Alva†	78	16	44.2	1.95	T.
Anadarko†	78	6	47.8	4.69	5.0
Arapaho†	75	12	44.0	3.10	3.0
Burnett†	81	7	46.2	5.15	3.0
Clifton†	78	18	46.3	5.53	4.0
Fort Reno†	79	12	44.2	3.24	3.7
Fort Sill	79	15	46.4	5.56	1.7
Guthrie†	75	7	46.4	4.81	4.0
Hennessey†	80	10	49.4	1.75	.....
Keokuk Falls†	79	8	47.8	5.71	3.5
Mangum†	84	15	46.3	2.26	2.0
Norman†	78	11	46.4	5.80	3.0
Oklahoma	.....	.....	.....	.....	2.5
Ponca†	86	11	43.6	2.20	2.0
Pondcreek†	75	10	42.1	1.99	1.0
Prudence†	.....	.....	.....	2.15	1.5
Sac and Fox Agency†	80	9	46.2	5.30	3.0
Stillwater†	78	9	45.9	4.69	.....
Winnview†[c]	77	14	42.8	3.17	2.9
Oklahoma—Cont'd.					
Woodward†	80	17	45.5	1.13	T.
Oregon.					
Albany *a*†	62	23	43.6	4.38	
Arlington†	68[4]	11	42.0	0.41	
Ashland *b*	64	19	39.4	1.13	1.0
Aurora*[3]	63	27	46.2	4.45	
Aurora (near)	61	23	42.2	5.17	
Baker City	.....	.....	.....	.....	1.1
Bandon	72	28	47.6	5.86	
Beulah†	56	5	32.6	0.10	1.5
Brownsville*[3]	64	20	42.3	3.81	
Burns†	68	2	30.2	.....	.....
Canyon City†	76	10	43.0	0.30	1.0
Cascade Locks	65	28	43.6	8.87	
Comstock*[3]	66	18	41.9	3.52	
Corvallis *a*	62	21	41.8	4.64	
Corvallis (near)	60	23	42.8	4.99	
Dayville†	.....	7	.....	0.35	
Detroit†	58	19	38.1	8.01	T.
Eugene†	60	22	42.6	3.56	
Fife†	69	4	34.4	0.35	1.5
Forest Grove	65	22	41.4	5.01	
Gardiner	64	30	47.6	5.66	
Glenora	60	21	40.8	13.25	
Grants Pass *a*†	63	15	40.6	2.14	
Happy Valley†	70	0	33.2	0.30	1.6
Hood River (near)	64	17	38.9	3.82	.....
Hubbard	69	22	41.4	3.35	
Irvington*	58	27	.....	2.08	
Jacksonville	58	20	38.2	1.74	0.5
Joseph†	56	3	31.6	0.72	4.2
Junction City*[3]	70	20	40.6	3.47	
Klamath Falls	74	11	43.7	0.39	3.0
Lafayette*[3]	66	24	46.5	3.13	
Lakeview†	62	11	33.2	1.10	11.0
Langlois	79	29	50.2	3.99	
Lone Rock	74	— 3	36.2	1.03	3.2
Lorella	70	2	38.8	0.50	2.5
McMinnville *a*†	61	22	41.5	5.42	
McMinnville *b*[3]	60	28	42.2	4.13	
Merlin*[3]	64	14	39.0	2.08	
Monmouth*[3]	64	28	43.9	3.88	
Mount Angel†	61	23	42.2	4.90	
Nehalem	.....	.....	.....	12.54	
Newberg	62	24	43.0[c]	5.05	
New Bridge	70	10	43.8	0.34	2.0
Newport	70	31	47.0	6.45	
Pendleton	70	14	41.8	1.19	0.6
Riddles*[3]	58	18	38.9	2.80	
Salem *a*[3]	62	32	48.6	3.26	
Salem *b*†	63	23	43.8	3.71	
Salmon	68	10	36.2	9.96	35.0
Sheridan*[3]	62	24	45.8	4.45	
Silverton*[3]	60	20	41.5	4.79	
Siskiyou*[3]	70	25	42.4	.....	6.0
Sparta	55	12	33.6	1.95	12.0
Springfield*[3]	62	17	36.3	3.80	
The Dalles†	68	17	41.8	1.20	0.2
Toledo	67	21	45.1	8.50	
Vale	61	6	34.4	0.14	
West Fork*[3]	62	24	43.8	4.37	
Weston	69	12	38.8	1.73	T.
Williams	62	17	40.0	2.37	
Pennsylvania.					
Altoona	72	23	44.4	1.30	.....
Aqueduct	77	21	43.3	2.20	
Beaver Dam†	.....	.....	.....	3.35	T.
Bethlehem	.....	.....	.....	1.66	
Brookville†	.....	.....	.....	3.96	1.0
Browers Lock	.....	.....	.....	3.00	
Cameron	.....	.....	.....	2.48	0.1
Carlisle	75	19	42.8	2.46	
Cassandra	68	16	41.2	2.21	5.5
Cedar Run	.....	.....	.....	3.60	
Center Hall†	.....	.....	.....	2.33	0.8
Chambersburg†	76	18	42.5	1.88	
Coatesville	76	19	44.8	1.39	
Confluence†	.....	.....	.....	3.02	1.0
Coopersburg	70	21	44.8	2.32	0.4
Davis Island Dam†	.....	.....	.....	3.01	.....
Doylestown	.....	.....	.....	1.89	.....
Drifton	71[4]	15[4]	40.0[4]	3.57	0.2
Driftwood	.....	.....	.....	1.95	
Dubois†	.....	.....	.....	3.37	1.8
Duncannon	.....	.....	.....	1.67	
Dyberry†	69	10	39.9	3.04	T.
East Bloomsburg	.....	.....	.....	2.50	
East Mauch Chunk	69	15	42.4	3.00	
Easton	71	21	44.0	2.22	
Edinboro*[1]	65	16	38.1	.....	.....
Ellwood Junction†	.....	.....	.....	3.22	.....
Emporium	73	14	41.1	2.59	T.
Erie	.....	.....	.....	.....	3.1
Farrandsville	.....	.....	.....	2.05	T.
Forks of Neshaminy*[1]	76	27	45.0	2.05	
Frederick	.....	.....	.....	1.82	
Pennsylvania—Cont'd.					
Freeport†	.....	.....	.....	3.68	.....
Gettysburg†	76	20	42.8	1.55	
Girardville	.....	.....	.....	2.71	
Grampian	72	12	38.4	2.57	1.5
Greensboro†	.....	.....	.....	3.12	.....
Hamburg	74	24	45.1	1.60	
Harrisburg	.....	.....	.....	.....	T.
Hollidaysburg	75	13	42.2	0.97	T.
Honesdale	70	13	41.2	2.16	
Huntingdon *a*†	75	15	43.6	1.07	
Huntingdon *b*	.....	.....	.....	1.81	
Johnstown†	.....	.....	.....	2.75	1.0
Karthaus	.....	.....	.....	2.13	
Keating	.....	.....	.....	2.04	0.2
Kennett Square	75	20	45.6	1.80	
Lancaster	78	21	44.8	1.36	
Lansdale	.....	.....	.....	2.68	
Lebanon	76	20	44.0	1.95	0.8
Le Roy†	68	14	38.8	3.06	0.3
Lewisburg	74	19	42.8	3.96	T.
Lock Haven *a*†	73	19	42.8	2.48	2.0
Lock Haven *b*	.....	.....	.....	2.69	.....
Lock No. 4†	.....	.....	.....	3.11	.....
Lycippus	72	12	43.0	2.75	
Mifflin	.....	.....	.....	1.91	
Nisbet	.....	.....	.....	2.16	
Oil City†	.....	.....	.....	5.11	0.8
Ottsville	.....	.....	.....	2.03	
Parker†	.....	.....	.....	4.00	3.0
Philadelphia *a*	.....	.....	.....	2.34	
Philadelphia *b*	75	26	46.9	2.08	
Philadelphia *c*	75	26	49.0	2.06	
Pittsburg	.....	.....	.....	.....	0.4
Point Pleasant	.....	.....	.....	1.93	
Pottstown	76	26	45.8	2.20	
Quakertown	73	18	43.2	2.60	T.
Reading[5]	.....	.....	41.2	1.30	
Renovo	.....	.....	.....	2.30	
Ridgway†	.....	.....	.....	2.95	0.8
Saegerstown	71	9	39.3	4.21	8.3
Salem Corners	70	15	40.8	4.25	T.
Scranton	72	15	41.8	1.74	T.
Seisholtzville	.....	.....	.....	1.92	
Selinsgrove	73	17	44.5	1.50	
Shinglehouse	67	8	37.5	3.81	4.2
Sinnamahoning	.....	.....	.....	1.07	
Smethport	70	6	38.0	3.45	3.0
Smiths Corners	.....	.....	.....	1.88	
Somerset	78	11	40.8	2.66	2.0
South Bethlehem	70	26	46.1	.....	
South Eaton	71	14	41.7	2.44	
Spruce Creek	.....	.....	.....	2.62	
State College	71	16	41.9	1.74	0.2
Sunbury	.....	.....	.....	2.08	
Swarthmore	74	21	44.6	1.73	
Towanda	75	13	41.8	2.22	T.
Uniontown	74	23	44.4	2.87	1.0
Warren†	.....	.....	.....	5.73	5.0
Waterville	.....	.....	.....	1.73	
Wellsboro*†	75	18	38.0	2.67	0.5
West Chester	73	22	45.6	1.55	
West Newton†	.....	.....	.....	3.17	T.
Westtown	73	24	44.6	1.42	T.
White Haven	68	13	40.6	2.95	T.
Wilkesbarre†	74	18	43.0	1.37	
Williamsport	73	21	41.1	1.95	
York†	77	20	43.6	1.80	T.
Rhode Island.					
Bristol	65	22	44.0	5.26	
Kingston	72	15	43.9	4.25	T.
Lonsdale	.....	.....	.....	7.77	
Pawtucket	71	24	44.1	8.56	
Providence *a*	70	22	45.2	6.66	
Providence *c*	71	18	44.2	6.88	T.
South Carolina.					
Allendale†	78	29	54.4	1.99	
Anderson†	.....	.....	.....	3.75	
Blackville†	80	26	52.6	1.34	
Camden†	.....	.....	.....	1.79	
Central†	75	23	53.0	2.28	
Cheraw *a*†	78	21	52.0	1.77	
Cheraw *b*†	.....	.....	.....	2.20	
Conway†	.....	.....	.....	2.61	
Darlington (near)	.....	.....	.....	1.53	
Effingham†	.....	.....	.....	1.46	
Florence†[b]	75	28	52.8	.....	
Georgetown†	82	32	56.6	2.73	
Gillisonville†	86	26	55.9	3.15	
Greenville†	76	22	52.6	3.62	
Greenwood†	.....	.....	.....	3.84	
Holland†	77	22	51.7	2.30	
Kingstree *a*†	88	37	58.4	1.92	
Kingstree *b*†	.....	.....	.....	1.74	
Little Mountain	87	28	56.0	2.45	
Longshore†	78	24	51.2	2.33	
Mount Carmel†	.....	.....	.....	3.11	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
South Carolina—Cont'd.	°	°	°	*Ins.*	*Ins.*
Pinopolis *[1]	74	32	54.9	4.46	
Port Royal †	76	37	58.1	2.80	
Ridgeway †	76	30	52.4	1.55	
St. George †	80	28	54.7	1.66	
St. Matthews †	82	28	54.5	1.96	
St. Stephens †	.....	.....	.....	2.45	
Santuck †	77	22	51.2	4.43	
Shaws Fork *[1]	86	33	58.0	0.40	
Society Hill †	77	26	53.4	2.04	
Spartanburg †	77	23	51.2	3.00	
Statesburg †	77	31	54.2	1.77	
Trenton	80	32	55.8	2.18	
Trial †	83	28	57.1	1.67	
Yemassee †	82	28	55.3	2.61	
Yorkville	78	24	53.0	3.18	
South Dakota.					
Aberdeen †	63	—14	24.1	3.86	12.5
Alexandria †	70	—15	29.4	1.32	2.5
Ashcroft †	66	— 5	28.4	0.50	5.0
Brookings †	67	— 7	29.4	1.02	3.5
Buffalo Gap *	68	3	32.3	0.30	3.0
Castlewood †	63	—14	25.3	2.05	4.0
Clark †	64	—12	26.6	2.32	7.5
Cross †	65	— 2	30.2	1.00	13.8
De Smet †	63	—12	28.0	0.86	3.8
Edgemont	.....	.....	.....	0.80	0.8
Farmingdale	.....	.....	.....	0.58	7.5
Faulkton †	69	— 8	26.8	1.12	2.0
Flandreau †	71	—10	28.0	1.23	8.0
Forestburg †	69	— 7	27.5	1.34	4.4
Forest City †	70	0	29.3	0.00	
Fort Meade	71	— 5	32.7	2.36	21.0
Gary †	65	— 7	28.2	1.76	11.0
Goudyville *† [1]	57	— 1	26.9	0.96	1.0
Greenwood	71	— 1	34.6	1.01	4.8
Highmore †	69	— 3	27.8	1.15	5.5
Hotch City †	73	— 5	29.7	0.68	4.8
Howard †	69	—10	28.6	1.29	7.0
Huron	.....	.....	.....	.....	5.8
Kimball †	70	0	30.6	1.45	6.5
Leslie †	79	— 6	27.6	0.02	0.2
Millbank †	62	—12	25.6	1.20	8.0
Northville *[1]	60	— 4	26.4	.....	
Nowlin †	74	—11	30.8	0.03	
Oelrichs †	65	— 3	31.3	1.50	15.0
Parker †	67	—10	29.4	1.90	5.0
Pierre	.....	.....	.....	.....	3.7
Plankinton †	72	— 6	29.0	0.70	2.0
Rapid City	.....	.....	.....	.....	11.0
Rochford	.....	.....	.....	2.13	13.4
Silver City	.....	.....	.....	0.95	
Sioux Falls †	67	— 6	30.1	0.89	4.8
Tyndall †	75	— 5	35.2	0.98	4.0
Vermillion	70	— 9	32.5	0.50	2.0
Watertown †	65	—20	25.6	1.17	9.0
Webster †	70	—16	26.2	4.89	21.0
Wentworth †	68	— 7	28.0	1.06	2.2
Wessington Springs †	67	— 2	30.3	0.87	3.0
Yankton †	72	— 2	33.0	1.24	8.3
Tennessee.					
Andersonville *[1]	75	22	46.1	1.99	
Ashwood *† [1]	74	23	50.3	2.40	
Bolivar †	76	20	47.9	4.37	
Bristol †	77	22	47.6	2.36	0.2
Byrdstown †	79	20	48.4	2.15	0.3
Carthage †	.....	.....	.....	2.20	T.
Chattanooga	.....	.....	.....	.....	T.
Clarksville †	77	22	47.6	4.68	T.
Clinton †	.....	.....	.....	2.03	
Covington †	78	28	52.0	7.52	
Dyersburg †	75	24	48.0	7.66	T.
Elizabethton †	.....	.....	.....	1.99	T.
Fairmount *[1]	70*	25	47.8*	2.40	T.
Florence †	75	22	50.2	0.02	T.
Franklin †	78	17	47.4	2.47	T.
Greeneville †	77	19	48.9	2.11	T.
Harriman †	83	23	49.4	0.78	T.
Hohenwald *† [2]	.....	17	42.4	2.47	T.
Jacksboro *[3]	75	21	47.7	2.06	T.
Jackson †	76	21	48.7	4.14	
Johnsonville †	.....	.....	.....	3.45	
Knoxville	.....	.....	.....	.....	T.
Loudon †	.....	.....	.....	2.45	
Lynnville *[1]	77	23	49.2	1.80	T.
McKenzie *† [1]	73*	24	49.6	3.20	T.
McMinnville †	76	21	49.4	2.85	T.
Mount Carmel †	75	25	53.8	7.39	
Nashville	.....	.....	.....	.....	T.
Newport *[3]	81	22	45.3	1.95	
Nunnelly *[1]	76	18	49.4	1.95	
Palmetto †	.....	.....	.....	2.24	
Riddleton †	73	22*	48.1	2.16	T.
Rockwood †	.....	.....	.....	1.83	
Rogersville *[1]	75	26	50.4	2.48	
Rugby *[1]	76	24	44.7	2.31	T.
Sewanee †	72	22	48.3	1.53	T.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Tennessee—Cont'd.	°	°	°	*Ins.*	*Ins.*
Springdale *[1]	76	20	50.3	2.64	T.
Trenton	75	22	47.9	7.23	
Tullahoma †	77	18	47.0	2.40	T.
Waynesboro *[1]	78	19	48.5	1.70	
Texas.					
Abilene	.....	.....	.....	.....	2.5
Albany *† [1]	70	27	50.1	2.24	2.0
Alice †	87	32	61.2	2.55	
Amarillo	.....	.....	.....	.....	0.7
Angleton	86	50	69.8	9.35	
Arthur City †	.....	.....	.....	2.42	
Aurora *[1]	84	24	52.2	3.68	2 0
Austin *a* †	80	30	59.7	3.10	
Austin *b* *[3]	77	31	56.2	.....	
Ballinger †	76	30	48.4	0.94	1.0
Beeville †	88	32	59.4	2.53	
Boerne *† [1]	78	29	55.2	4.75	
Brady †	80	20	50.4	3.50	T.
Brazoria †	80	32	61.2	7.99	
Brenham †	80	30	56.1	2.47	
Burnet *† [1]	80	30	56.3	3.35	
Camp Eagle Pass †	82	30	56.6	2.15	
Chillicothe	78	16	45.4	0.25	2.5
Coleman *[2]	.....	24	50.2	1.04	
College Station	77	28	56.0	4.67	
Colmesneil	.....	.....	.....	4.55	
Columbia †	80	31	59.0	7.19	
Corsicana *a* † [2]	86	25*	53.6*	4.46	.....
Corsicana *b* †	81	22	53.0	6.10	T.
Cuero †	86	33	59.6	3.83	
Dallas †	80	24	49.8	3.84	T.
Dean † [b]	80	10	41.6	0.65	
Dublin †	80	21	49.9	1.41	.....
Durham †	.....	.....	.....	2.00	
Duval *[1]	81	30	56.6	4.38	
Estelle †	81	21	51.2	4.61	4.5
Flower Bluff †	84	34	63.4	2.97	
Forestburg †	72	26	50.4	4.02	2.0
Fort Brown †	84	41	65.5	1.84	
Fort Clark	77	39	57.8	2.07	
Fort McIntosh	83	33	60.0	0.86	
Fort Ringgold †	86	38	62.0	1.19	
Fort Stockton †	.....	.....	.....	1.18	
Fort Worth †	79*	25*	54.0*	2.45	
Fredericksburg *† [1]	75	28*	52.2	4.74	
Gainesville †	79*	22*	51.2*	3.97	5.0
Georgetown *[1]	78	28	52.9	4.01	
Golindo	.....	.....	.....	4.25	
Goree *† [1]	76	15	47.2	2.08	2.5
Graham †	79	10	48.6	4.17	2.0
Grape Vine †	80	22	53.1	5.49	0.8
Hale Center †	80	18	48.4	0.80	3.0
Hallettsville †	83	31	57.4	3.01	
Happy †	75	14	43.0	0.77	.....
Haskell †	72	17	47.9	2.10	2.0
Hewitt	.....	.....	.....	5.00	
Houston †	79	34	58.5	4.91	
Huntsville †	79	30	55.4	2.60	
Kent	.....	.....	.....	2.08	
Kerrville †	77	26	50.6	4.22	
Lampasas †	79	27	54.6	3.30	
Leakey †	86	28	55.0	2.67	
Llano *† [3]	75	30	54.0	1.80	
Longview †	80	28	53.2	2.66	
Luling †	81	31	56.7	3.48	
Marshall †	81	28	54.1	5.70	
Menardville *† [1]	76	22	50.0	2.33	
Midland †	85	15	52.6	1.70	2.0
Mount Blanco † [1]	80*	6	44.4	0.14	0.1
New Braunfels †	77	30	55.6	4.15	
Orange †	78	33	57.0	4.21	
Panter †	.....	.....	.....	2.81	
Paris †	81	25	50.0	3.26	T.
Roby †	.....	.....	.....	3.76	8.0
Rockport *[1]	82	36	61.8	.....	
Rock Springs †	80	21	52.7	1.82	
Runge †	86	31	59.9	2.96	
San Antonio	80	31	58.0	3.40	
San Marcos *a* †	.....	.....	.....	4.26	
Sierra Blanca †	85	29	56.6	1.32	6.0
Stafford †	81	28	57.3	6.60	
Sulphur Springs † [1]	83	25*	51.0	6.11	T.
Temple †	75	26	52.0	4.48	
Twohig †	.....	.....	.....	1.71	.....
Tyler †	80	26	53.2	2.27	
Waco †	81	28	52.6	4.95	
Weatherford †	77	22	51.0	2.66	2.0
Wichita Falls †	80	12	48.8	3.04	2.5
Utah.					
Blue Creek *[2]	65	15	37.8	0.50	5.0
Brigham City	.....	.....	.....	2.23	
Castlegate †	55	6	27.6	1.42	14.2
Cisco †	62	17	36.6	0.53	8.5
Corinne *[3]	60	17	32.2	.....	6.5
Deseret †	62[f]	4[f]	33.4[f]	0.84	.....
Fillmore †	75	6	38.4	1.46	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Utah—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fort Duchesne †	57	—11	27.1	0.90	9.1
Grover †	65	2	31.4	1.35	13.0
Huntsville †	.....	.....	.....	2.07	13.0
Kelton *[3]	49	18	32.7	0.05	0.5
Koosharem	65	— 1*	30.4	2.00	.....
Levan †	61	6	32.9	1.63	10.0
Loa †	59	5	30.0	0.50	5.0
Logan †	62	5	31.3	1.70	
Manti †	74	— 6	33.7	1.25	12.5
Millville †	.....	.....	.....	2.43	.....
Moab †	61	17	38.5	1.38	0.1
Moroni †	.....	.....	.....	1.47	17.5
Mount Pleasant *† [1]	71	4	35.4	1.90	20.0
Ogden *a* *[3]	60	21	35.5	1.71	6.0
Pahreah †	65	19	39.0	1.50	1.0
Parowan †	63	3	34.3	1.28	11.5
Promontory *[3]	68	13	34.6	0.80	8.0
Provo City [3]	.....	.....	28.4	.....	
St. George †	74	11	42.2	1.01	
Salt Lake City	.....	.....	.....	.....	16.0
Scipio †	65	4*	32.0*	1.35	10.0
Snowville †	60	— 2	31.2	1.30	13.0
Soldier Summit †	50	— 5	23.4	1.90	19.0
Terrace *[3]	70	17	31.3	0.42	4.2
Thistle †	61	4	28.9	1.61	16.1
Vernal †	50	1	29.6	1.33	11.1
Vermont.					
Brattleboro	71	13	39.2	3.86	3.5
Burlington †	63	8	40.0	4.32	3.0
Chelsea †	66	— 1	33.8	5.91	10.0
Cornwall	69	1	37.8	4.88	7.0
Enosburg Falls †	.....	.....	.....	6.24	5.5
Hartland †	73	2	35.8	5.84	4.5
Irasburg †	64	7	34.1	5.95	8.0
Jacksonville	65	8	34.3	4.65	6.0
Northfield	.....	.....	.....	.....	7.4
Norwich	68	1	37.3	5.38	6.0
St. Johnsbury	65	2	34.7	6.08	6.5
Simonsville	66	4	33.8	3.39	6.0
Strafford *† [1]	66	4	35.7	4.86	7.0
Vernon *[6]	70	16	38.2	5.13	3.3
Wells	68	5	37.4	5.25	5.5
Woodstock	71	2	35.2	5.36	5.5
Virginia.					
Abingdon †	.....	.....	.....	2.77	0.5
Alexandria	78	28	45.0	0.69	T.
Ashland †	80	22	48.6	2.62	
Avon †	80	19	48.4	2.88	
Bedford City †	70	27	47.1	2.04	
Big Stone Gap †	76	16	43.6	2.81	1.0
Birdsnest *† [1]	80	32	51.8	2.45	
Blacksburg	75	15	43.0	1.44	T.
Buchanan †	.....	.....	.....	3.12	
Buckingham †	80	12	46.8	1.86	T.
Callaville †	77	26	49.4	2.09	
Charlottesville	77	22	49.0	1.77	T.
Christiansburg †	.....	.....	.....	1.71	
Dale Enterprise †	77	18	43.2	1.42	0.2
Fredericksburg †	81	26	48.8	1.56	
Hampton	76	32	54.8	2.72	
Hot Springs	74	20	46.4	0.80	T.
Irwin †	77	21	47.3	2.00	
Lexington †	77	21	46.2	1.99	0.2
Lynchburg	.....	.....	.....	.....	T.
Manassas †	79	20	45.8	1.14	T.
Marion † [7]	75	21	47.6	1.98	
Monterey † [7]	70	18	39.8	1.30	0.1
Nottoway	80	22	49.6	2.58	
Petersburg †	75	25	49.2	2.76	
Richmond (near) †	82	24	49.8	3.77	T.
Richmond *b* †	.....	.....	.....	2.77	
Rockymount †	74	24	50.4	6.45	1.0
Salem †	81	25	51.0	1.85	
Saltville	76	17	46.6	1.74	T.
Smithville †	73	25	47.9	1.38	
Spottsville †	77	23	48.5	2.27	
Stanardsville †	77	22	46.2	2.03	
Staunton †	78	21	46.2	1.85	T.
Stephens City †	80	21	45.4	1.02	T.
Sunbeam †	79	26	51.3	2.40	
Warsaw †	78	21	47.4	4.08	
Westbrook Farm	78	26	48.4	.....	
Wytheville †	75	18	44.2	2.08	T.
Washington.					
Aberdeen †	59	28	42.4	9.18	
Anacortes	.....	.....	.....	2.86	
Ashford	.....	.....	.....	7.45	4.0
Blaine †	62	19	39.8	4.82	
Cascade Tunnel †	51	16	37.6	6.98	40.0
Centerville †	66	9	38.3	1.05	0.8
Colfax †	61	13	38.4	2.24	3.0
Connell †	70	30	46.2	.....	.....
Coupeville †	56	27	43.7	1.70	
Dayton †	64	16	38.7	2.35	
East Sound †	60	31	45.2	3.33	
Ellensburg †	67	8	35.0	0.20	.....

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Washington—Cont'd.	°	°	°	*Ins.*	*Ins.*
Ellensburg (near)	62	8	35.9	0.25	2.0
Fort Simcoe	68	18	40.7	0.66	T.
Fort Spokane	67	10	34.4	0.49	0.9
Grand Mound†	62	20	41.4	5.77	
Hunters†	52	8	29.7	0.96	8.5
Lakeside†	58	20	36.7	0.54	4.0
Lapush†	63	31	47.2	9.59	
Madrone*†‡	62	26	44.6	2.67	
Monte Cristo†	56	24	39.4	10.92	48.0
Moxee Valley†	67	8	40.8	0.21	T.
Neah Bay	.....	.....	.....	.....	T.
New Whatcom†	61	24	44.6	3.68	
Olga†	60	32	44.5	4.21	
Pine Hill†	62	15	39.7	1.66	0.2
Pomeroy†	68	21	43.3	0.87	2.0
Pullman†	58	12	36.2	2.54	3.0
Rosalia†	56	10	36.5	1.52	3.1
Silver Creek*‡	59	24	40.0	6.67	
Snohomish†	61	21	42.9	2.63	
South Bend†	67	22	45.1	6.60	
Spokane	.....	.....	.....	.....	6.1
Stillaguamish†	56	17	39.4	5.16	
Sunnyside†	67	9	38.6	0.33	0.6
Tacoma†	62	26	42.5	4.79	
Tatoosh Island	.....	.....	.....	.....	T.
Union†	65	25	44.7	6.92	
Vashon†	61	18	39.0	4.33	
Walla Walla	.....	.....	.....	.....	T.
Waterville†	61	11	33.2	0.30	2.0
Wenatchee Lake†	60	15	34.3	.....	10.0
West Ferndale†	69	24	43.9	5.54	
West Virginia.					
Beverly†	76	12	41.4	1.54	1.5
Bloomery†	77	16	41.8	1.34	
Bluefield†	82	18	47.1	2.13	2.0
Buckhannon *a*†	.....	.....	.....	2.67	
Charleston†	.....	.....	.....	2.54	
Dayton*‡	78	30	45.4	.....	
Elkhorn†	75	24	49.0	1.95	1.5
Ella†	73	30	44.4	3.11	T.
Fairmont†	.....	.....	.....	2.92	T.
Glenville†	76	30	44.7	2.77	
Grafton†	77	22	46.0	2.27	0.8
Green Sulphur	75	19	42.6	0.75	
Harpers Ferry†	.....	.....	.....	2.50	
Hewett†	77	21	46.0	0.87	4.0
Hinton *a*†	.....	.....	.....	1.82	1.0
Hinton *b*†	78	21	46.8	.....	1.5
Leachtown†	.....	.....	.....	1.99	0.2
Marlinton†	75	14	42.5	1.82	0.5
Martinsburg†	79	21	43.7	1.50	T.
Morgantown *a*†	.....	.....	.....	2.86	T.
Morgantown *b*†	75	19	43.8	1.65	T.
New Martinsville†	79	22	43.9	2.70	
Nuttallburg†	87	19	46.5	1.75	T.
Parkersburg	.....	.....	.....	.....	T.
Point Pleasant†	78	23	45.2	2.51	
Powellton†	74	19	42.3	2.32	0.5
Rowlesburg†	.....	.....	.....	2.75	2.0
Sandyville†	78	19	44.1	1.84	
Spencer†	.....	.....	.....	4.00	T.
Tannery*‡	80	18	44.8	.....	
Weston *a*†	.....	.....	.....	2.87	1.0
Weston *b**‡	78	20	44.2	2.87	1.0
Wheeling *a*†	.....	.....	.....	2.95	0.6
Wheeling *b*†	71	26	44.3	2.51	T.
Wisconsin.					
Amherst	72	— 1	31.6	1.41	12.0
Antigo†	70	— 5	28.1	1.03	9.4
Apollonia*†‡	64[e]	1	32.2	0.74	3.0
Barron†	68	— 4	26.2	0.80	4.5
Beloit	68	2	33.4	2.11	7.0
Black River Falls†	70	— 3	30.2	0.78	6.5
Boscobel†	72	0	33.5	2.47	6.0
Butternut†	71	— 5	28.5	0.72	2.2
Centralia	71	2	31.9	1.35	5.0
Chilton	70	0	30.7	1.35	4.7
City Point	71	.....	.....	0.83	4.2
Crandon†	65	— 6[4]	23.6	2.20	20.0
Delavan†	69	— 8	32.2	1.93	10.0
Depere†	71	4	32.0	1.71	9.7
Eau Claire	70	— 1	31.9	1.83	7.0
Florence†	55	— 4	26.7	0.99	11.9
Fond du Lac†	68	0	31.0	1.17	5.5
Grantsburg†	51	.....	.....	0.65	6.5
Green Bay	.....	.....	.....	.....	7.5
Hartford	.....	.....	.....	3.31	14.5
Harvey†	68	— 1	31.1	2.53	11.4
Hayward†	67	— 5	28.9	0.82	3.1
Hillsboro[1]	69	0	31.7	1.38	6.0
Janesville†	69	— 2	34.1	1.56	7.5
Kenosha*[10]	60	5	33.4	.....	
Koepenick*†‡	62	0	25.6	1.65	14.5
La Crosse	.....	.....	.....	.....	10.9
Lancaster†	69	2	31.6	2.45	10.0
Lincoln†[2]	.....	.....	38.0	2.30	8.0
Madison†	66	7	33.2	1.17	3.2
Manitowoc†	52	6	32.7	1.19	5.7
Meadow Valley†	73	— 3	32.2	1.17	6.3
Medford†	70	— 5	28.6	1.84	16.9
Milwaukee	.....	.....	.....	.....	18.4
Nellisville†	70	— 2	30.3	1.29	4.0
New Holstein†	69	2	33.2	1.10	11.0
Oconomowoc†	69	— 2	33.0	1.81	8.0
Oconto	65	2	31.4	1.12	4.5
Osceola†	69	— 8	28.5	1.14	2.0
Oshkosh†	72	6	34.3	1.71	7.1
Pepin	72	— 4	32.0	1.30	9.0
Pine River†	74[e]	— 3[e]	30.8[e]	1.64	7.4
Port Washington	60	7	33.8	2.79	17.1
Prairie du Chien	73	1	32.3	1.55	3.0
Racine*[10]	52	4	35.2	.....	.....
Royalton	67	1	31.2	1.78	12.0
Sharon†	68	0	31.7	3.68	17.5
Shawano	69	2	31.2	1.03	5.0
Spooner†	64	— 8	28.7	0.95	4.5
Stevens Point†	68	— 1	31.6	1.28	11.6
Sturgeon Bay Canal*[10]	55	8	33.2	.....	.....
Two Rivers*[10]	54	10	35.0	.....	.....
Valley Junction†	72	— 4	32.1	1.36	8.2
Viroqua	68	5	31.9	1.50	5.5
Watertown†	69	0	32.8	1.98	10.5
Waukesha†	69	5	33.5	2.11	13.3
Waupaca*‡	72	0	30.3	1.78	6.0
Wausau†	65	0	29.7	1.44	9.0
West Bend	70	5	33.5	1.85	10.5
Westfield†	68	— 2	31.6	1.73	7.4
Whitehall†	70	— 6	30.6	0.88	5.0
Wyoming.					
Big Horn Ranch†	57	— 7	28.8	1.23	13.0
Cheyenne	.....	.....	.....	.....	6.3
Fort Laramie†	69	— 1	34.5	1.05	9.0
Fort Washakie	65	—12	27.6	1.93	19.3
Wyoming—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fort Yellowstone†	56	—10	26.0	1.30	13.0
Lander (V. O.)	65	— 6	28.1	1.97	21.5
Lander (W. B.)	.....	.....	.....	.....	23.0
Laramie	56	— 4	26.0	0.32	.....
Lusk†	62	—10	28.6	1.23	3.0
Sheridan	69	—18	29.0	1.07	9.5
Sundance	61	— 2	28.0	2.72	25.0
Wheatland†	68	0	33.8	0.80	8.0
Mexico.					
Ciudad P. Diaz	77	36	58.9	2.00	
Leon de Aldamas	81	44	63.3	1.59	
Mexico	75	44	59.4	0.34	
Puebla	79	46	63.0	0.18	
Topolobampo*‡	85	58	71.8	2.02	
New Brunswick.					
St. John	56	11	33.8	11.42	4.2
West Indies.					
Grand Turk Island	.....	.....	.....	3.79	

EXPLANATION OF SIGNS.

* Extremes of temperature from observed readings of dry thermometer.

† Weather Bureau instruments.

‡ Record furnished by the Arrowhead Reservoir Company, in the San Bernardino Mountains, San Bernardino County, Cal., at elevations varying from 4,900 to 6,900 feet.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.
[2] Mean of 8 a. m. + 8 p. m. ÷ 2.
[3] Mean of 7 a. m. + 7 p. m. ÷ 2.
[4] Mean of 6 a. m. + 6 p. m. ÷ 2.
[5] Mean of 7 a. m. + 2 p. m. + 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.
[7] Mean from hourly readings of thermograph.
[8] Mean of 7 a. m. + 2 p. m. + 9 p. m. ÷ 3.
[9] Mean of sunrise and noon.
[10] Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "[e]" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

CORRECTIONS.

Ohio, Demos, August, 1895, make total precipitation 4.87 instead of 6.53.

September, 1895, page 331, under head of "Difference between instrumental and personal observations of sunshine," make difference at Vicksburg read 6 instead of 14.

NOTE.—The following changes have been made in names of stations: Missouri, Vilas changed to Irena.

TABLE III.—*Data from Canadian stations for the month of November*, 1895.

Stations.	Pressure.			Temperature.		Precipitation.		Prevailing direction of wind.	Total depth of snow.
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.		
	Inches.	*Inches.*	*Inches.*	°	°	*Inches*	*Inches.*		
St. Johns, N. F	29.97	30.12	+ .19	37.0	0.0	5.38	.....	s.	T.
Sydney, C. B. I	30.08	30.14	+ .18	39.4	+ 1.9	7.15	+ 2.43	w.	2.0
Grindstone, G. St. L.	30.02	30.05	.....	35.7	.....	7.19	.....	n.	6.5
Halifax, N. S	30.02	30.15	+ .15	40.6	+ 2.6	8.21	+ 2.92	nw.	T.
Grand Manan, N. B.	30.08	30.13	.....	40.4	.....	12.29	+ 7.62	w.	1.6
Yarmouth, N. S.	30.07	30.15	+ .11	41.4	+ 1.4	7.47	+ 2.20	n.	0.9
St. Andrews, N. B.	.....	.....	.....	38.0	.....	7.98	+ 4.42	nw.	4.0
Charlottet'n, P. E. I.	30.08	30.12	.....	38.4	.....	6.31	+ 2.31	w.	3.9
Chatham, N. B	30.11	30.13	+ .15	32.6	+ 2.1	5.86	+ 2.89	w.	16.5
Father Point, Que.	30.06	30.09	+ .13	30.3	+ 1.3	4.28	+ 2.06	s.	20.3
Quebec, Que	29.78	30.12	+ .11	30.2	+ 1.2	3.86	— 0.45	sw.	10.0
Montreal, Que	29.92	30.14	+ .12	33.5	+ 1.0	5.07	+ 1.51	s.	12.7
Rockliffe, Ont	29.58	30.11	+ .11	26.8	— 2.2	3.60	+ 0.86	se.	18.0
Kingston, Ont	29.80	30.12	+ .08	36.4	+ 0.9	3.83	+ 0.19	sw.	....
Toronto, Ont	29.74	30.13	+ .08	35.2	— 1.3	4.35	+ 1.81	ne.	2.1
White River, Ont	28.67	30.09	.....	19.8	— 0.7	1.74	+ 0.30	s.	10.0
Port Stanley, Ont	29.48	30.14	+ .09	36.7	.....	4.82	+ 2.21	e.	2.8

TABLE III.—*Data from Canadian stations*—Continued.

Stations.	Pressure.			Temperature.		Precipitation.		Prevailing direction of wind.	Total depth of snow.
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.		
	Inches.	*Inches.*	*Inches.*	°	°	*Inches*	*Inches.*		
Saugeen, Ont	29.37	30.11	+ .09	34.3	— 1.2	3.92	— 0.21	s.	14.7
Parry Sound, Ont.	29.38	30.10	+ .08	31.9	— 0.1	4.70	+ 0.77	w.	21.6
Port Arthur, Ont	29.30	30.03	+ .02	23.3	— 1.2	0.58	— 0.27	w.	3.3
Winnipeg, Man	29.17	30.05	— .02	16.8	— 1.2	0.95	— 0.24	n.	4.7
Minnedosa, Man	28.11	30.02	— .02	14.4	— 2.1	1.01	+ 0.28	nw.	10.1
Qu'Appelle, Assin.	27.68	30.06	+ .03	16.2	— 3.3	0.82	+ 0.18	nw.	8.2
Medicine Hat, Assin	27.64	30.02	— .02	27.1	+ 0.1	0.52	+ 0.16	w.	4.0
Swift Curr't, Assin.	27.86	30.06	.00	21.8	— 0.2	0.34	— 0.47	w.	2.4
Calgary, Alberta	26.32	29.99	— .05	24.6	— 1.4	0.49	— 0.29	w.	4.9
Prince Albert, Sask.	28.45	30.06	.....	14.0	.....	1.64	.....	s.	16.4
Edmonton, Alberta.	27.61	30.05	+ .07	24.1	— 2.9	0.92	+ 0.52	sw.	4.4
Battleford, Sask	28.20	30.02	.....	17.8	.....	0.63	.....	nw.	5.8
Spences Br'ge, B. C.	29.21	30.05	.....	38.8	.....	0.25	.....	e.	0.1
Hamilton, Bermuda	30.04	30.20	+ .15	72.6	.....	3.59	.....	s.	
Banff, Alberta	25.34	30.13	.....	23.8	.....	1.73	.....	sw.	....
Esquimalt, B. C	30.06	30.09	.....	42.6	.....	3.40	.....	sw.	0.0
Sable Island	30.15	.....	.....	45.5	.....	5.96	.....	sw.	....

TABLE IV.—*Mean temperature for each hour of seventy-fifth meridian time, November, 1895.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Bismarck, N Dak	19.5	18.9	19.1	18.6	17.5	17.2	17.1	17.2	16.9	18.1	20.3	23.1	25.4	27.0	27.6	28.0	27.4	25.8	24.0	22.9	21.7	21.0	20.4	19.2	21.4
Boston, Mass	43.2	42.8	42.6	42.1	41.7	41.5	41.7	42.4	43.5	45.1	46.9	48.5	49.1	49.3	49.7	49.2	48.3	47.3	46.3	45.5	44.8	44.3	43.5	43.0	45.1
Buffalo N Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Ill	35.8	35.4	34.9	34.7	34.6	34.3	34.1	34.6	34.9	36.1	37.3	38.6	39.2	39.7	40.2	40.4	40.1	39.5	38.8	38.4	37.7	37.2	36.7	36.6	37.1
Cincinnati, Ohio	42.1	41.3	40.7	40.2	39.6	39.1	38.9	39.1	40.2	42.7	45.6	47.4	48.7	49.1	49.4	49.4	48.7	47.9	47.1	45.9	45.0	44.1	43.4	42.9	44.1
Cleveland, Ohio	39.1	38.7	38.8	38.7	38.2	37.8	37.5	37.6	38.3	40.1	42.3	44.2	44.8	45.3	45.6	45.3	44.8	43.8	42.9	41.5	40.9	40.0	39.9	39.2	41.0
Detroit, Mich	36.6	36.1	35.9	35.5	34.8	34.5	34.3	34.1	34.7	36.4	38.0	39.3	40.2	40.9	41.2	41.1	40.2	39.1	38.5	38.1	37.6	37.3	36.8	36.6	37.4
Dodge City, Kans	36.3	35.1	34.5	33.8	33.3	32.4	31.9	31.6	31.4	34.8	40.2	44.0	47.3	49.6	51.4	52.1	51.7	50.0	45.6	42.7	40.7	39.4	37.7	36.8	40.2
Eastport, Me	39.0	38.9	39.0	38.9	38.7	38.7	38.3	38.7	39.4	40.4	41.2	41.8	42.3	42.2	42.1	41.9	41.1	40.7	40.1	39.8	39.2	38.8	38.4	38.2	39.9
Galveston, Tex	60.5	60.2	59.9	59.7	59.4	59.2	59.1	59.2	59.2	59.6	60.4	61.5	62.2	62.3	62.6	62.8	63.0	62.8	62.4	62.3	61.8	61.7	61.4	61.2	61.0
Havre, Mont	38.3	37.9	37.9	37.7	36.9	36.6	36.4	36.3	35.6	35.4	37.1	39.7	32.1	33.5	34.7	35.4	35.3	34.0	31.6	29.9	28.2	27.8	27.7	27.0	29.3
Kansas City, Mo	39.8	39.3	37.9	37.1	36.5	35.9	35.6	35.4	35.9	37.6	39.9	42.3	44.4	46.0	47.2	47.7	47.6	46.8	45.5	44.2	43.6	42.8	41.8	40.8	41.3
Key West, Fla	74.3	73.9	73.8	73.7	73.6	73.4	73.5	73.8	74.2	74.8	75.4	75.7	76.3	76.8	76.9	76.6	76.0	75.4	75.0	74.9	74.8	74.8	74.6	74.4	74.9
Marquette, Mich	30.8	30.5	30.2	30.2	29.9	29.5	29.1	29.2	29.3	30.3	31.4	33.2	34.1	35.1	35.5	35.4	34.9	33.6	32.7	32.4	32.2	32.0	31.7	31.5	31.9
Memphis, Tenn	49.4	48.8	48.5	47.9	47.6	47.6	46.6	45.7	45.9	47.4	50.0	52.2	54.0	55.3	56.6	57.0	57.0	56.4	55.2	53.9	52.7	51.6	50.8	49.9	51.2
New Orleans, La	57.1	56.7	56.3	56.0	55.6	55.1	54.6	54.6	56.0	58.6	61.8	63.4	65.0	65.7	66.1	65.8	65.4	64.4	62.7	61.2	59.9	59.2	58.5	57.8	59.9
New York, N Y	44.2	43.9	43.6	43.4	43.1	43.0	42.9	43.1	43.6	44.4	45.8	46.8	47.9	48.1	48.9	48.8	47.6	47.2	46.3	45.6	45.1	44.9	44.6	43.9	45.3
Philadelphia, Pa	44.7	44.2	43.7	43.3	43.1	42.9	42.8	43.6	44.5	45.9	47.2	48.6	49.9	51.0	51.5	51.3	50.2	48.8	47.7	47.1	46.1	45.8	45.2	44.8	46.4
Pittsburg, Pa	42.1	41.8	41.4	41.1	40.8	40.5	40.4	40.6	41.6	43.5	46.4	48.6	50.5	51.0	51.5	51.3	50.4	49.1	47.4	46.3	45.0	44.1	43.5	42.6	45.1
Portland, Oreg	43.4	42.8	42.3	42.1	41.4	40.8	40.3	40.3	39.9	39.5	40.1	41.5	43.1	44.4	46.1	47.0	48.0	48.3	47.9	47.1	46.3	45.4	44.5	44.0	43.6
St. Louis, Mo	41.7	41.2	40.7	40.0	39.5	39.2	38.8	38.5	39.1	40.8	42.8	44.6	46.0	47.0	48.0	48.4	48.3	47.5	46.2	45.4	44.3	43.5	42.8	42.3	43.2
St. Paul, Minn	29.3	28.6	27.8	27.2	26.8	26.9	26.5	26.2	26.1	27.5	30.1	32.1	33.9	35.4	36.7	37.0	36.8	35.7	34.2	32.9	31.9	31.2	30.3	29.9	30.9
Salt Lake City, Utah	34.8	34.2	33.5	33.3	33.6	33.8	33.1	33.4	33.3	33.9	35.5	38.2	40.0	42.0	42.8	43.6	43.7	43.3	41.4	38.9	37.2	35.7	35.0	34.5	37.0
San Diego, Cal	57.5	56.4	55.8	55.3	54.8	54.6	53.9	53.5	53.0	54.5	59.0	62.1	64.4	65.7	66.1	66.3	66.0	65.6	64.2	62.8	60.7	59.4	58.2	57.5	59.5
San Francisco, Cal	54.4	54.2	53.7	53.4	53.4	52.6	52.2	52.1	52.1	52.0	52.7	54.0	55.4	57.5	59.2	60.8	60.9	60.9	59.7	57.8	56.7	55.5	55.2	55.2	55.5
Santa Fe, N. Mex	31.9	31.3	30.9	30.2	29.7	29.3	28.6	28.3	28.4	31.4	34.0	36.5	38.2	39.7	40.7	41.9	41.7	40.8	38.1	35.6	34.2	33.6	33.1	32.4	34.2
Savannah, Ga	54.5	53.9	53.4	52.9	52.5	52.0	51.7	52.8	55.4	58.6	60.9	63.0	64.4	65.0	64.9	63.9	61.9	59.8	58.5	57.8	57.1	56.4	55.7	55.0	57.6
Washington, D. C	43.5	43.4	43.2	42.7	42.2	41.9	41.3	42.0	44.0	46.4	48.5	50.4	51.8	52.9	53.7	53.1	51.6	49.8	48.2	46.2	45.2	44.3	43.6	43.1	46.4

TABLE V.—*Mean pressure for each hour of seventy-fifth meridian time, November, 1895.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Bismarck, N. Dak	28.225	.223	.223	.222	.221	.219	.222	.222	.227	.228	.225	.223	.214	.199	.193	.192	.199	.208	.219	.225	.226	.229	.230	.232	.219
Boston, Mass	30.001	.003	.997	.003	.006	.014	.024	.035	.039	.038	.024	.012	.001	.999	.001	.003	.009	.017	.020	.024	.024	.023	.025	.022	.015
Buffalo, N. Y	29.349	.353	.352	.346	.350	.356	.365	.379	.387	.388	.385	.371	.357	.350	.349	.351	.355	.359	.364	.364	.368	.367	.365	.364	.362
Chicago, Ill	29.198	.197	.201	.195	.194	.201	.200	.211	.219	.219	.222	.216	.204	.192	.185	.186	.193	.199	.202	.207	.209	.210	.203	.202	.203
Cincinnati, Ohio	29.470	.472	.474	.475	.479	.483	.491	.501	.508	.511	.508	.495	.477	.464	.459	.459	.464	.470	.479	.480	.480	.477	.473	.472	.480
Cleveland, Ohio	29.305	.306	.308	.311	.315	.322	.328	.337	.341	.341	.333	.318	.301	.292	.291	.293	.301	.311	.316	.318	.317	.318	.319	.316	.315
Detroit, Mich	29.321	.319	.321	.318	.319	.323	.326	.334	.340	.344	.345	.337	.319	.307	.305	.305	.310	.317	.322	.326	.330	.332	.327	.328	.394
Dodge City, Kans	27.445	.440	.436	.434	.431	.429	.425	.429	.432	.439	.462	.462	.446	.419	.405	.396	.395	.398	.414	.416	.425	.433	.436	.437	.431
Eastport, Me	30.040	.035	.027	.026	.026	.033	.045	.052	.057	.057	.046	.034	.026	.026	.029	.031	.040	.044	.048	.052	.055	.053	.049	.047	.041
Galveston, Tex	30.113	.111	.107	.105	.104	.108	.120	.136	.152	.163	.163	.155	.133	.108	.092	.085	.085	.085	.090	.099	.106	.112	.117	.115	.115
Havre, Mont	27.345	.343	.342	.340	.341	.338	.341	.343	.353	.361	.370	.372	.374	.361	.354	.346	.342	.342	.344	.346	.348	.351	.354	.355	.350
Kansas City, Mo	29.083	.078	.081	.084	.085	.087	.092	.099	.107	.114	.116	.111	.092	.067	.050	.043	.046	.047	.054	.061	.025	.069	.072	.073	.078
Key West, Fla	30.046	.038	.030	.025	.026	.034	.047	.061	.077	.084	.080	.065	.043	.025	.016	.012	.015	.025	.035	.049	.058	.062	.061	.054	.045
Marquette, Mich	29.241	.236	.237	.230	.229	.229	.233	.237	.240	.245	.246	.238	.221	.215	.210	.218	.223	.229	.237	.236	.237	.239	.241	.241	.233
Memphis, Tenn	29.733	.730	.729	.730	.728	.733	.740	.747	.763	.773	.778	.771	.748	.723	.708	.701	.698	.701	.710	.719	.726	.731	.731	.732	.733
New Orleans, La	30.109	.106	.106	.102	.106	.113	.124	.135	.149	.157	.154	.143	.117	.093	.079	.076	.073	.077	.085	.096	.108	.113	.115	.113	.110
New York, N. Y	29.809	.810	.809	.809	.812	.817	.829	.841	.848	.851	.842	.827	.814	.805	.801	.804	.808	.815	.823	.830	.835	.838	.839	.837	.823
Philadelphia, Pa	30.038	.041	.042	.042	.048	.053	.064	.078	.086	.087	.074	.055	.040	.031	.028	.030	.034	.045	.051	.057	.061	.062	.061	.059	.053
Pittsburg, Pa	29.236	.241	.244	.244	.247	.255	.261	.269	.274	.278	.270	.254	.230	.220	.218	.219	.225	.230	.239	.243	.246	.248	.246	.246	.245
Portland, Oreg	29.988	.989	.991	.992	.990	.989	.986	.985	.986	.994	.998	.000	.007	.008	.997	.986	.977	.975	.971	.970	.975	.977	.980	.982	.987
St. Louis, Mo	29.520	.517	.520	.517	.516	.522	.532	.544	.532	.561	.562	.555	.538	.519	.504	.500	.499	.501	.503	.508	.517	.517	.515	.513	.523
St. Paul, Minn	29.145	.146	.149	.147	.145	.144	.145	.148	.154	.157	.160	.158	.146	.130	.121	.118	.119	.126	.131	.136	.139	.142	.142	.141	.141
Salt Lake City, Utah	25.723	.722	.713	.714	.712	.708	.711	.709	.714	.719	.726	.727	.726	.710	.691	.682	.682	.683	.684	.694	.701	.708	.714	.717	.708
San Diego, Cal	29.958	.958	.955	.954	.950	.945	.941	.939	.955	.963	.973	.980	.985	.974	.950	.936	.927	.926	.926	.931	.945	.952	.960	.965	.952
San Francisco, Cal	29.996	.997	.997	.996	.995	.992	.992	.992	.998	.944	.958	.964	.969	.960	.939	.923	.912	.910	.908	.907	.917	.923	.930	.937	.934
Santa Fe, N. Mex	23.283	.283	.280	.280	.279	.278	.276	.278	.282	.289	.292	.297	.294	.278	.261	.248	.244	.243	.247	.255	.261	.266	.270	.274	.272
Savannah, Ga	30.054	.052	.049	.048	.051	.062	.074	.086	.093	.098	.092	.072	.050	.034	.027	.026	.029	.039	.050	.059	.065	.069	.068	.065	.059
Washington, D. C	30.062	.065	.064	.063	.065	.076	.087	.098	.110	.116	.110	.089	.066	.052	.048	.049	.051	.059	.068	.074	.080	.084	.082	.082	.075

TABLE VI.—*Average wind movement for each hour of seventy-fifth meridian time, November, 1895.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.	8.7	8.3	8.3	8.6	8.4	8.2	8.4	9.0	9.7	10.5	11.6	12.0	12.4	12.5	12.6	12.1	11.9	11.5	8.7	8.0	8.0	8.7	9.2	9.2	9.9
Albany, N. Y.	4.9	5.1	5.1	5.0	5.6	6.2	5.9	6.4	6.4	7.9	8.6	9.8	10.3	10.2	9.6	8.5	6.9	6.2	5.8	5.4	5.0	5.1	5.1	5.2	6.7
Alpena, Mich.	8.0	8.4	8.1	7.7	7.9	7.7	7.8	7.8	8.2	8.9	9.5	10.2	11.2	11.8	12.0	12.1	10.6	9.7	9.1	9.0	8.8	8.6	8.6	8.6	9.2
Amarillo, Tex.	15.0	15.6	16.8	16.6	16.0	15.2	14.7	15.0	14.5	14.9	15.7	16.1	17.3	17.3	16.8	17.1	17.2	15.6	13.8	14.3	15.1	15.1	15.0	14.6	15.6
Atlanta, Ga.	10.4	10.4	10.4	10.3	10.3	10.4	9.8	9.6	9.8	10.4	10.7	10.6	10.5	10.7	10.6	10.7	10.4	8.9	9.0	9.3	10.3	10.8	11.0	10.7	10.3
Augusta, Ga.	3.8	4.4	4.6	4.6	5.1	4.8	4.6	4.4	5.1	6.3	6.5	7.2	8.4	7.9	8.0	7.8	7.2	5.7	5.3	4.7	4.5	4.7	4.6	4.3	5.6
Baker City, Oreg.	5.2	6.1	6.6	6.4	5.8	5.9	5.6	5.7	5.4	5.7	5.2	5.3	4.0	4.9	5.5	6.1	6.2	6.7	5.6	4.0	5.0	5.6	5.6	5.5	5.6
Baltimore, Md.	6.8	7.2	6.9	6.6	6.4	6.5	7.1	7.1	7.4	8.0	8.5	8.6	8.6	9.1	9.2	9.0	8.5	7.7	7.0	6.9	6.5	6.2	6.6	6.6	7.5
Bismarck, N. Dak.	6.8	6.3	6.5	6.7	6.3	6.0	6.0	6.3	6.1	6.9	7.9	7.7	8.3	10.3	10.6	10.7	10.4	9.5	8.8	8.0	7.8	7.5	7.3	7.2	7.7
Block Island, R. I.	16.6	16.9	15.7	15.7	16.4	15.6	15.7	15.3	15.6	16.7	17.0	17.2	16.4	17.1	17.2	16.5	16.6	16.9	17.0	17.4	18.3	17.5	17.1	16.1	16.6
Boston, Mass.	10.5	10.4	10.0	9.6	9.5	9.2	9.2	9.8	10.4	10.9	11.5	12.0	12.0	12.5	12.5	12.7	11.6	11.6	11.7	12.0	11.9	11.2	11.0	10.2	11.0
Buffalo, N. Y.	12.2	11.5	11.3	12.2	12.1	12.0	12.1	11.7	12.1	12.5	12.6	13.0	13.2	12.4	12.8	12.4	11.4	10.8	10.0	9.8	10.3	10.4	10.3	11.5	11.7
Cairo, Ill.	7.0	7.0	6.8	6.6	7.1	7.3	7.4	7.3	8.1	9.5	10.6	9.9	10.1	10.2	10.5	10.8	9.7	8.6	7.7	7.6	7.3	7.9	8.0	7.4	8.3
Cape Henry, Va.	15.3	14.9	14.8	14.9	14.8	14.0	13.6	15.2	15.3	15.9	15.8	15.1	16.2	16.2	16.1	15.4	14.1	14.0	14.0	14.7	14.8	14.7	14.5	15.0	15.0
Charleston, S. C.	8.1	8.1	8.3	8.0	8.1	7.8	8.4	8.6	8.9	9.2	9.3	9.3	9.7	9.6	10.2	10.0	8.9	8.2	7.8	7.5	7.7	7.9	8.0	8.2	8.6
Charlotte, N. C.	6.8	7.3	6.9	7.3	7.2	7.1	6.4	6.6	6.9	8.1	9.4	9.3	9.8	9.8	9.7	9.6	8.2	6.9	6.7	6.9	7.2	7.4	7.8	7.3	7.8
Chattanooga, Tenn.	5.4	5.9	5.5	5.3	5.3	5.6	5.5	5.7	5.8	6.8	7.7	7.9	7.9	8.6	9.1	9.4	8.9	8.0	7.2	6.1	6.0	6.3	5.8	5.4	6.7
Cheyenne, Wyo.	9.5	9.8	9.8	10.4	11.4	10.7	11.3	10.9	10.9	11.0	11.9	13.8	15.5	16.4	17.0	16.4	16.4	15.3	13.4	11.1	11.0	10.8	10.6	9.4	12.3
Chicago, Ill.	18.9	18.5	18.7	18.1	18.0	18.5	18.7	18.5	17.9	18.2	19.4	18.8	20.0	19.4	20.0	20.3	20.4	19.8	19.9	20.8	20.5	19.8	19.9	20.5	19.3
Cincinnati, Ohio.	6.5	6.5	6.1	6.0	5.9	5.7	5.5	5.7	6.0	6.9	7.4	8.2	9.2	9.4	9.3	9.0	8.9	8.3	7.5	7.5	7.0	6.7	7.1	6.1	7.2
Cleveland, Ohio	15.1	15.7	16.1	15.7	16.0	15.7	15.3	14.7	14.2	14.1	13.6	14.0	14.2	13.6	13.8	13.0	12.9	12.1	11.8	12.0	12.2	12.8	13.4	13.6	14.0
Columbia, Mo.	7.3	7.4	8.3	7.8	8.4	8.3	8.5	8.8	8.9	10.0	10.7	10.9	11.2	11.1	11.3	10.8	10.4	8.9	8.3	9.1	9.2	9.0	9.1	8.1	9.2
Columbus, Ohio	6.6	6.5	6.6	5.9	6.2	6.5	6.2	6.3	6.6	6.7	6.8	7.5	7.8	7.3	7.2	7.3	7.2	6.7	6.2	6.7	6.7	6.9	6.9	6.6	6.7
Concordia, Kans.	9.2	8.6	7.9	8.6	8.5	8.1	8.0	8.1	7.4	8.3	9.5	9.9	9.6	10.3	10.2	10.2	9.4	8.5	7.4	7.4	8.1	8.9	9.7	10.3	8.8
Corpus Christi, Tex.	9.0	8.2	8.2	8.6	8.4	9.0	9.1	9.7	9.2	9.5	9.5	10.3	10.7	11.2	11.7	12.2	11.9	11.0	10.3	9.4	9.3	10.0	9.4	9.4	9.8
Davenport, Iowa.	9.1	8.9	9.3	8.9	9.2	8.7	8.4	9.0	8.8	9.5	10.4	11.2	11.5	11.5	11.2	11.3	11.2	9.9	9.5	9.4	9.5	9.5	9.4	9.0	9.8
Denver, Colo.	6.6	7.5	7.1	7.0	8.4	7.7	8.3	8.1	7.4	7.2	7.1	7.0	8.5	9.2	9.7	9.7	10.1	9.6	8.0	8.4	7.4	7.7	7.2	7.0	8.0
Des Moines, Iowa.	8.1	8.3	8.8	8.2	8.3	8.5	8.0	8.5	8.5	9.6	11.1	11.7	11.5	11.6	11.4	11.5	11.2	10.0	8.9	8.3	7.8	8.1	7.9	8.1	9.3
Detroit, Mich.	10.7	10.5	10.4	11.1	11.0	11.4	10.6	10.8	10.4	10.8	11.7	11.9	11.9	11.7	11.7	11.3	10.9	10.2	9.9	10.1	10.1	10.7	11.2	11.3	10.9
Dodge City, Kans.	10.3	10.5	10.6	10.2	10.0	9.6	8.5	8.2	7.9	8.4	10.9	12.3	12.3	12.6	13.4	13.6	13.6	12.0	9.1	8.8	9.7	10.2	10.7	10.6	10.6
Duluth, Minn.	7.3	7.8	7.6	7.3	7.4	7.1	7.4	7.8	8.7	9.1	8.8	7.6	8.0	8.2	8.0	7.5	6.8	5.4	5.8	7.1	7.6	6.9	7.3	7.8	7.5
Eastport, Me.	11.6	11.6	11.9	11.8	11.5	11.8	11.7	11.5	12.3	12.5	12.6	13.1	12.4	12.6	12.9	11.4	11.7	12.2	12.0	12.7	12.9	12.8	11.8	11.7	12.1
El Paso, Tex.	10.0	9.8	8.4	8.1	8.8	8.1	7.8	7.3	8.2	8.0	8.6	9.9	12.4	13.7	14.6	15.7	15.7	14.6	13.3	11.1	10.0	10.1	11.4	10.8	10.7
Erie, Pa.	11.5	12.0	12.1	12.2	11.9	12.3	12.4	12.8	12.8	12.4	12.8	11.9	11.9	11.5	10.7	10.4	9.9	9.4	9.7	10.4	11.5	11.2	11.5	11.5	11.5
Eureka, Cal.	4.0	4.2	4.0	3.3	3.4	3.9	4.2	4.4	4.4	4.8	4.8	4.7	4.7	6.0	6.2	7.5	8.3	8.6	7.7	6.5	5.9	4.9	4.7	4.7	5.2
Fort Canby, Wash.	12.6	12.8	12.1	12.3	12.2	12.2	12.3	12.2	12.8	12.9	12.8	13.0	11.5	11.4	12.1	12.8	14.1	13.3	13.0	13.9	13.9	14.1	12.8	12.0	12.7
Fort Smith, Ark.	5.2	5.7	5.9	5.5	5.8	5.8	5.8	6.4	6.9	7.2	7.1	6.7	7.0	7.9	7.9	9.2	8.7	7.3	6.3	6.6	6.4	5.7	5.2	5.6	6.6
Fresno, Cal.	4.0	4.2	3.6	3.8	4.1	4.1	4.3	4.3	3.7	3.7	3.5	3.1	3.5	3.5	3.4	3.8	4.6	4.5	4.1	3.6	3.3	3.5	3.7	3.6	3.8
Galveston, Tex.	12.3	11.5	11.2	11.1	11.1	10.9	11.0	11.0	11.1	11.3	11.3	11.6	11.8	11.8	11.5	11.0	11.0	11.4	11.2	11.3	12.0	12.1	12.3	12.0	11.4
Grand Haven, Mich.	10.2	10.4	10.3	10.2	10.5	10.3	9.7	9.6	9.8	10.5	11.2	12.0	12.4	12.0	11.7	11.8	11.5	10.0	10.1	10.2	10.7	10.4	10.3	10.4	10.7
Green Bay, Wis.	8.4	8.1	7.6	8.1	8.2	8.3	8.5	8.5	8.5	9.4	10.2	10.6	10.6	11.3	10.5	10.4	10.1	8.8	8.4	9.1	8.1	7.8	8.2	8.4	9.0
Hannibal, Mo.	8.4	8.4	8.6	8.7	9.3	8.8	8.9	8.0	8.4	9.6	10.9	11.1	12.0	12.3	12.3	11.9	11.1	9.8	9.0	9.3	9.2	9.1	9.1	8.9	9.7
Harrisburg, Pa.	5.2	6.1	5.5	5.2	5.3	5.9	6.6	6.6	7.0	7.4	7.7	7.7	7.2	7.5	8.3	7.5	6.9	6.7	6.1	5.4	5.3	5.0	5.2	4.8	6.3
Hatteras, N. C.	15.4	15.7	15.6	15.7	16.3	16.5	16.1	16.6	16.7	16.9	16.7	16.6	17.0	17.8	17.6	17.2	17.5	16.9	16.7	17.0	15.9	15.9	16.1	16.0	16.5
Havre, Mont.	8.6	9.2	9.0	9.8	10.0	10.0	9.9	10.5	10.0	9.3	9.3	10.3	11.6	12.2	12.0	11.7	10.9	9.5	8.5	7.9	8.3	8.5	8.7	9.3	9.8
Helena, Mont.	8.1	7.8	7.3	7.6	7.8	8.1	7.9	7.5	8.2	7.8	7.4	7.4	9.4	8.8	10.1	10.3	9.3	9.5	9.7	9.1	8.9	9.0	7.1	7.2	8.4
Huron, S. Dak.	11.0	10.8	10.9	10.8	11.4	11.6	11.3	11.2	11.2	11.1	11.3	12.0	12.0	12.7	13.5	13.7	13.3	12.2	11.7	11.6	11.8	12.1	12.2	11.6	11.8
Idaho Falls, Idaho.	5.8	5.7	5.6	5.4	5.5	5.5	5.2	6.0	5.7	6.2	5.9	5.7	6.3	6.4	7.1	7.4	7.5	7.4	7.0	6.8	6.3	6.2	6.0	5.9	6.2
Independence, Cal.	8.3	8.4	8.6	9.2	8.7	8.1	7.9	7.8	8.7	8.7	7.8	8.5	9.9	10.8	10.6	10.3	10.3	10.2	9.4	9.2	8.8	8.2	8.3	8.7	9.0
Indianapolis, Ind.	5.7	5.8	5.7	5.4	5.6	5.7	5.3	5.2	5.6	6.4	6.7	7.4	7.8	8.0	7.9	7.6	7.1	6.4	6.5	6.5	6.5	5.9	5.8	6.3	6.4
Jacksonville, Fla.	6.0	6.0	6.3	6.5	6.5	6.5	6.7	6.9	7.3	7.7	8.3	9.0	9.2	8.8	9.1	9.2	8.7	7.6	6.6	6.3	6.4	6.4	6.4	6.3	7.2
Jupiter, Fla.	9.1	8.9	8.5	8.4	9.3	9.0	9.2	9.0	9.8	11.2	12.3	12.5	13.1	12.9	12.6	12.7	12.2	11.3	10.6	10.1	10.0	9.3	9.3	9.3	10.4
Kansas City, Mo.	8.9	8.9	8.6	9.3	9.5	9.3	10.1	9.7	10.1	10.4	10.9	11.6	11.8	11.0	11.1	11.1	10.4	9.5	8.3	8.1	8.1	8.4	8.4	8.7	9.7
Keokuk, Iowa.	7.8	7.8	7.8	7.9	7.4	7.0	7.3	7.1	7.2	8.3	9.3	9.5	9.8	10.2	10.0	10.2	10.0	8.6	8.2	8.5	8.7	8.4	7.9	7.8	8.4
Key West, Fla.	10.4	12.0	11.1	11.1	11.3	11.4	11.1	11.4	11.8	11.9	11.4	12.2	11.7	11.6	11.5	11.2	10.9	10.7	10.0	10.9	11.7	12.0	11.5	11.2	11.3
Kittyhawk, N. C.	17.3	17.0	17.6	17.5	18.4	17.9	18.3	17.8	18.5	17.9	19.1	19.4	20.0	20.1	19.4	19.7	18.9	17.8	17.9	17.9	18.1	18.2	17.7	17.7	18.3
Knoxville, Tenn.	4.0	3.6	3.7	3.6	3.5	4.2	3.9	4.1	4.5	5.6	5.8	6.5	6.5	6.8	7.3	6.9	6.3	5.1	4.2	4.4	4.2	3.7	3.9	4.4	4.9
La Crosse, Wis.	7.1	7.3	7.2	7.6	7.7	7.1	7.4	7.7	8.2	8.3	8.7	8.6	9.1	9.9	10.0	10.0	9.3	7.6	7.0	7.0	7.4	7.2	7.7	6.8	8.0
Lander, Wyo.	2.4	2.3	2.2	2.5	2.0	2.1	2.1	2.4	2.4	2.5	2.8	2.3	2.4	2.7	3.9	3.8	4.0	3.8	3.4	2.8	2.7	2.0	2.2	2.0	2.7
Lexington, Ky.	12.5	12.9	12.3	12.7	13.1	12.4	12.2	11.9	12.4	12.6	13.5	14.0	13.9	14.2	14.1	12.7	11.2	10.7	11.1	11.1	11.7	12.3	13.4	12.4	12.5
Little Rock, Ark.	6.0	5.9	6.2	6.0	5.1	4.7	5.4	5.5	5.8	6.9	7.6	7.4	8.4	9.0	9.0	8.7	9.0	7.8	6.7	6.6	6.6	5.9	5.6	5.8	6.7
Los Angeles, Cal.	1.9	2.3	2.5	2.7	2.7	2.7	2.8	2.2	2.7	3.1	3.3	3.7	3.6	3.0	3.3	4.3	4.8	5.1	4.7	3.6	2.1	2.1	1.9	2.1	3.1
Louisville, Ky.	6.8	6.6	6.4	6.3	6.4	6.6	6.1	6.9	7.3	7.9	8.8	9.7	10.2	10.3	9.6	9.6	9.2	8.2	7.9	8.6	8.1	8.1	7.3	7.0	7.9
Lynchburg, Va.	2.4	2.3	2.4	2.9	3.1	3.3	3.1	3.5	3.6	4.7	5.1	5.2	5.8	5.6	5.9	5.4	4.8	3.8	3.7	3.4	3.3	2.8	3.0	3.0	3.8
Marquette, Mich.	10.1	10.8	11.0	11.4	10.2	10.4	10.3	10.4	10.8	11.0	10.3	11.0	11.3	11.9	12.3	11.8	10.3	9.0	9.2	10.1	11.1	10.6	10.2	10.3	10.7
Memphis, Tenn.	10.7	10.5	9.8	9.7	10.7	10.5	10.4	10.0	9.4	10.3	9.9	10.9	10.5	9.9	10.1	10.3	9.7	10.0	9.7	8.7	8.9	10.0	10.5	10.6	10.1
Meridian, Miss.	4.7	4.4	4.2	3.9	3.6	3.6	3.8	4.1	5.0	7.1	8.0	8.1	7.8	8.0	8.0	7.5	7.4	6.2	5.0	4.9	4.7	4.5	4.6	4.4	5.6
Miles City, Mont.	4.8	4.1	4.5	4.3	3.9	4.1	4.4	4.9	5.4	5.8	6.0	6.6	7.7	8.0	9.0	9.2	8.3	7.3	6.7	6.2	5.7	5.0	5.2	4.7	5.9
Milwaukee, Wis.	9.6	9.8	9.5	9.4	9.7	9.4	9.8	9.7	10.6	10.7	11.1	11.8	12.7	12.7	12.4	12.4	11.7	10.7	9.9	10.0	10.7	10.3	10.0	10.0	10.6
Mobile, Ala.	6.7	6.4	6.0	6.5	6.4	6.6	6.8	6.4	7.0	8.0	8.5	9.2	9.3	9.5	9.3	9.1	8.5	7.0	6.7	5.4	5.8	6.1	6.8	6.6	7.3
Montgomery, Ala.	5.1	5.1	5.2	4.8	5.4	5.2	4.7	4.7	5.4	7.2	7.8	8.2	8.1	8.1	8.6	8.3	7.5	6.3	5.9	5.6	6.0	6.0	5.8	5.2	6.3
Moorhead, Minn.	8.8	9.0	9.5	9.2	9.4	8.7	8.6	8.7	8.4	8.8	9.1	9.1	9.4	9.9	10.3	10.5	10.2	9.0	8.8	9.1	9.1	9.2	9.1	9.2	9.2
Nantucket, Mass.	12.4	12.1	11.9	12.0	11.6	10.9	10.6	11.0	10.9	12.5	12.7	12.2	13.0	13.4	12.8	11.7	11.4	11.5	11.2	12.2	13.1	13.2	12.6	12.3	12.1
Nashville, Tenn.	5.9	6.2	6.0	5.6	5.8	5.3	5.8	5.6	6.1	7.1	8.3	8.8	9.6	9.0	9.3	8.6	7.9	7.5	7.0	7.4	6.6	6.3	5.6	6.0	7.0
New Haven, Conn.	7.9	8.2	8.0	8.1	8.2	8.2	7.7	8.2	8.7	8.5	9.2	10.3	11.2	12.1	11.5	10.6	9.4	8.8	8.6	8.3	8.3	7.7	7.8	8.1	8.9
New Orleans, La.	8.1	8.2	8.2	8.3	8.7	8.5	8.6	9.2	9.6	11.0	11.3	10.7	11.2	11.0	10.6	10.2	9.7	7.9	6.6	7.0	7.6	7.8	8.5	7.4	9.0
New York, N. Y.	13.8	13.3	13.0	12.7	12.1	11.3	12.1	12.4	13.0	13.1	13.4	13.4	14.0	14.6	13.7	13.2	14.3	14.7	15.2	14.2	14.1	13.6	13.1	13.9	13.4
Norfolk, Va.	8.0	7.7	7.7	7.7	7.8	7.3	7.4	7.7	9.0	9.3	9.8	10.6	11.0	10.8	10.3	9.5	8.7	7.6	8.6	8.8	8.2	7.9	8.0	7.4	8.6
Northfield, Vt.	7.4	7.8	7.8	7.1	7.2	7.1	7.7	7.6	7.9	7.9	8.6	9.5	11.2	10.7	10.0	8.9	8.0	7.9	8.7	9.0	8.6	8.9	8.4	7.6	8.4
North Platte, Nebr.	8.5	7.9	6.9	7.1	7.1	6.5	5.7	5.5	4.7	5.4	7.3	8.0	8.8	10.4	11.3	12.3	12.4	10.7	8.7	8.7	9.4	8.9	8.9	8.6	8.3
Oklahoma, Okla.	8.5	9.1	8.5	9.4	9.9	9.6	9.5	9.8	9.9	10.7	11.9	13.0	12.5	13.0	13.1	13.3	12.9	11.1	8.8	8.0	8.2	8.1	9.4	8.5	10.3
Omaha, Nebr.	9.6	9.5	9.4	9.0	8.7	8.5	8.4	8.4	9.0	8.9	9.0	9.1	9.7	9.7	10.0	10.4	10.1	9.0	7.9	7.8	8.5	8.5	8.9	9.1	9.0
Oswego, N. Y.	10.9	11.4	11.1	11.5	11.7	11.9	12.2	12.8	12.9	13.0	12.8	12.6	11.4	11.4	11.2	10.5	10.3	10.7	10.2	10.9	11.4	11.0	11.3	14.4	11.5
Palestine, Tex.	5.5	5.7	5.8	5.4	5.4	5.2	5.2	5.4	5.4	6.7	7.8	8.2	8.4	8.3	8.0	7.9	7.8	7.1	5.0	5.0	5.5	6.1	6.0	5.9	6.4
Parkersburg, W. Va.	4.8	5.2	4.8	4.9	4.9	4.3	4.3	4.3	4.6	5.1	5.9	6.5	6.6	6.7	6.7	6.1	5.4	4.5	3.9	4.1	4.1	4.7	4.3	4.4	5.0

TABLE VI.—*Average wind movement, etc.*—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Pensacola, Fla.	9.5	9.3	8.8	9.1	8.7	8.8	9.5	9.3	10.0	10.8	11.2	10.9	10.3	9.9	9.6	9.0	9.0	7.9	8.2	8.4	8.3	8.4	9.3	9.1	9.3
Philadelphia, Pa.	9.3	9.5	9.2	9.1	9.1	9.2	9.5	9.7	10.4	10.7	11.1	11.0	12.0	12.0	11.1	10.8	10.6	9.8	9.2	9.2	9.4	9.3	9.4	9.1	10.0
Phœnix, Ariz.	4.2	4.4	4.2	4.1	4.0	4.5	4.1	3.9	3.7	3.7	3.8	5.1	5.4	5.8	6.8	6.8	5.9	5.3	4.2	3.6	3.2	4.1	4.4	4.5	4.6
Pierre, S. Dak.	6.3	5.6	5.5	5.7	5.8	5.0	5.3	5.4	5.7	5.9	7.1	7.8	7.9	8.1	9.0	9.7	8.7	8.7	8.2	6.8	6.7	7.8	7.4	7.0	7.0
Pittsburg, Pa.	5.8	5.5	5.6	6.0	5.9	5.6	5.6	5.9	6.0	6.4	7.3	7.7	8.0	8.2	7.9	7.3	7.0	6.2	6.0	6.0	5.9	5.5	5.7	5.7	6.4
Port Angeles, Wash.	4.9	4.9	4.9	4.8	4.6	4.7	4.6	4.7	4.6	4.5	4.4	3.8	3.2	3.2	3.7	4.3	4.8	5.0	3.9	4.6	4.8	5.0	4.9	5.0	4.5
Port Huron, Mich.	11.6	11.5	11.5	12.0	12.4	12.7	12.3	12.5	11.6	11.9	11.4	11.8	12.7	12.5	12.0	11.8	11.8	10.8	11.7	11.4	12.1	12.8	12.9	12.0	12.0
Portland, Me.	6.1	6.0	6.4	6.6	7.0	6.8	6.5	6.8	6.9	6.5	6.8	7.5	7.8	7.8	8.1	7.8	7.1	7.1	7.3	7.1	6.5	6.0	6.2	5.9	6.9
Portland, Oreg.	7.1	7.0	7.0	7.2	7.5	7.2	7.1	7.0	6.9	7.4	6.3	6.7	7.7	8.0	8.6	8.9	8.7	8.4	7.9	8.1	7.7	7.1	7.1	7.5	7.5
Pueblo, Colo.	6.0	5.6	5.5	6.1	5.4	4.8	5.1	5.3	5.5	5.0	5.1	6.7	7.3	8.4	9.1	9.4	10.3	9.5	8.1	6.7	5.8	5.4	6.4	6.5	6.6
Raleigh, N. C.	5.9	6.3	6.3	6.4	6.9	6.7	6.5	6.9	7.4	8.4	8.9	9.1	9.4	9.1	9.0	8.6	6.8	5.2	5.3	5.8	6.2	6.6	6.4	6.3	7.1
Rapid City, S. Dak.	8.6	8.0	7.8	8.7	7.8	7.4	7.0	6.3	6.8	5.9	5.9	6.7	8.4	9.3	10.3	10.2	10.0	8.5	7.1	7.6	8.2	8.6	9.1	8.9	8.0
Red Bluff, Cal.	5.4	5.3	5.7	6.5	5.5	5.7	5.7	5.8	5.4	5.6	5.5	6.6	7.2	8.3	8.6	9.5	9.6	9.1	8.3	6.5	6.4	6.1	5.6	5.3	6.6
Rochester, N. Y.	6.3	7.0	7.2	7.5	7.9	8.0	8.1	8.1	8.1	8.9	9.4	9.8	9.4	8.9	8.7	8.1	7.2	6.9	6.5	6.3	6.2	6.3	6.3	6.5	7.6
Roseburg, Oreg.	2.2	1.9	2.4	1.9	2.0	2.0	2.6	2.7	2.0	2.6	2.4	2.7	3.2	3.4	3.6	3.9	4.8	5.0	4.9	3.7	2.8	2.6	2.3	2.3	2.9
Sacramento, Cal.	9.6	10.0	9.4	8.7	8.5	7.3	7.1	7.1	6.8	6.6	7.0	7.3	7.0	7.5	7.7	8.3	9.0	8.2	7.7	7.2	7.4	8.0	8.1	8.8	7.9
St. Louis, Mo.	10.8	10.8	10.4	10.7	10.4	10.4	10.8	10.6	10.9	11.8	12.7	13.7	13.5	13.6	13.6	13.3	13.3	12.5	12.4	11.9	12.3	11.8	11.3	11.6	11.9
St. Paul, Minn.	6.0	6.1	6.6	6.8	6.7	7.2	7.0	7.8	8.1	7.9	8.9	8.9	9.1	9.1	8.9	8.6	8.4	7.1	6.7	6.1	6.1	6.0	6.2	5.9	7.3
St. Vincent, Minn.	8.5	9.2	8.6	8.3	8.3	7.5	7.5	8.0	8.0	8.0	8.9	9.4	9.7	10.8	10.7	10.4	10.5	9.3	8.2	9.3	8.5	8.3	8.6	8.6	8.9
Salt Lake City, Utah.	4.3	4.5	4.8	4.5	4.3	4.2	4.2	4.5	4.6	4.4	4.7	5.1	5.7	5.6	6.7	6.9	6.7	5.6	4.7	4.4	3.6	4.2	4.6	4.4	4.9
San Antonio, Tex.	6.5	6.3	6.5	6.2	5.8	6.1	5.8	6.3	6.0	6.6	7.8	8.9	9.8	10.0	10.1	10.1	10.0	9.8	8.7	8.0	7.5	7.1	6.7	6.7	7.6
San Diego, Cal.	4.4	4.8	4.5	4.4	4.6	4.5	4.7	4.5	4.2	4.0	4.2	3.8	4.7	6.0	7.6	8.9	8.7	8.7	7.8	5.9	4.7	3.9	4.1	4.1	5.3
Sandusky, Ohio	9.8	9.5	9.3	9.4	9.2	9.3	9.2	8.8	8.9	8.9	9.1	8.7	8.4	8.4	7.9	7.6	7.3	7.2	8.3	8.3	8.8	8.5	9.1	9.5	8.7
San Francisco, Cal.	7.0	7.1	6.3	5.2	5.7	6.1	6.4	6.0	6.5	6.5	6.8	6.9	7.1	7.3	7.6	8.1	9.4	9.7	10.2	10.9	9.9	10.3	9.5	7.7	7.7
San Luis Obispo, Cal.	3.0	2.5	2.7	2.8	2.9	3.0	3.1	3.4	3.2	3.2	3.4	3.6	4.8	5.1	6.2	7.5	7.5	8.0	6.7	5.6	4.8	4.3	3.4	3.2	4.3
Santa Fe, N. Mex.	4.7	4.7	4.6	5.3	5.1	5.1	5.0	4.9	4.8	6.0	7.1	8.4	8.6	9.3	9.4	9.8	9.9	10.0	7.0	4.8	4.6	4.8	5.2	5.0	6.4
Sault Ste Marie, Mich.	6.9	7.1	7.4	7.2	7.5	7.1	7.4	7.6	7.4	8.5	9.6	9.7	9.1	9.5	9.6	8.8	8.7	8.2	7.6	7.5	6.8	6.6	7.0	7.2	7.9
Savannah, Ga.	7.7	7.3	7.8	8.2	8.2	8.3	8.2	7.8	7.8	8.5	9.2	9.9	9.3	10.1	9.8	10.1	9.2	7.9	8.2	7.9	7.9	8.2	7.7	8.1	8.5
Seattle, Wash.	5.1	5.0	5.3	5.5	5.5	5.1	5.4	5.5	5.7	5.9	6.1	6.0	6.8	6.9	6.9	6.3	6.2	6.6	6.4	6.4	5.7	5.7	5.1	5.5	5.9
Shreveport, La.	6.3	6.8	6.4	5.5	5.7	5.9	5.6	5.9	6.5	8.0	8.1	8.5	8.5	8.4	8.1	8.5	8.3	7.3	6.4	6.9	6.9	7.5	7.1	7.0	7.1
Sioux City, Iowa	10.4	11.4	11.5	11.1	10.6	10.9	10.4	10.8	11.0	10.9	11.9	11.5	12.5	12.8	13.0	12.6	12.1	10.6	9.3	9.4	9.9	10.9	10.7	11.1	11.1
Spokane, Wash.	4.4	4.5	4.7	4.2	4.0	3.5	3.2	3.6	3.9	3.7	4.0	4.0	4.8	5.6	6.0	6.3	6.4	6.2	5.7	5.9	5.0	5.3	5.3	4.9	4.8
Springfield, Ill.	10.0	9.4	9.1	8.6	8.6	8.7	9.0	9.4	9.5	10.3	11.2	11.7	12.1	12.2	12.3	12.4	11.6	10.5	10.2	10.6	10.7	10.3	10.0	9.9	10.3
Springfield, Mo.	9.9	10.1	10.1	10.3	10.5	10.8	11.0	11.8	11.7	12.0	12.3	12.7	12.5	12.8	13.3	13.0	12.3	11.7	10.0	10.8	10.7	11.1	11.0	10.5	11.4
Tampa, Fla.	5.1	5.3	5.2	5.4	5.5	5.2	5.1	5.6	6.8	7.8	8.6	8.4	8.2	7.8	7.4	7.4	7.2	6.3	5.8	5.7	5.7	5.6	5.1	5.1	6.3
Tatoosh Island, Wash.	11.8	10.9	11.4	11.4	12.0	13.4	13.0	13.1	12.7	12.2	11.7	12.8	13.5	12.7	12.3	13.1	12.4	12.2	11.6	11.9	11.6	12.0	11.9	12.5	12.3
Toledo, Ohio.	9.7	9.0	8.8	9.1	9.7	9.1	9.1	9.2	9.0	8.8	9.6	10.4	10.4	10.2	10.0	10.6	10.4	9.4	9.3	9.0	9.4	9.6	10.1	9.7	9.6
Vicksburg, Miss.	7.4	7.3	7.3	7.2	7.1	7.1	6.8	7.1	7.9	8.3	8.4	7.8	7.8	7.7	8.2	8.5	7.7	6.5	6.1	6.3	7.0	6.7	7.6	7.6	7.4
Vineyard Haven, Mass	9.9	9.3	9.4	9.3	9.4	9.2	8.5	8.5	9.2	10.2	10.1	10.4	11.1	11.3	10.4	9.9	8.8	8.9	9.2	9.5	10.1	9.9	10.2	9.9	9.7
Walla Walla, Wash.	5.8	6.0	6.0	5.5	5.6	5.5	5.5	5.3	5.3	4.4	4.5	5.0	6.3	6.9	6.2	5.9	6.1	5.8	5.8	5.6	5.9	5.6	6.0	5.7	5.7
Washington, D. C.	6.0	5.8	6.0	5.4	5.2	5.0	5.6	5.5	6.0	7.7	8.1	8.2	8.4	8.2	8.1	8.0	6.9	6.3	5.7	5.5	4.9	4.8	4.6	5.0	6.3
Wichita, Kans.	9.9	9.9	10.6	10.4	10.4	9.9	10.1	10.0	9.9	11.1	11.8	12.5	13.4	13.0	13.4	13.1	11.9	10.0	8.8	8.0	8.7	9.2	9.4	9.3	10.6
Williston, N. Dak.	7.1	7.5	7.0	6.9	6.9	6.5	7.2	7.2	7.8	8.3	8.8	9.7	9.5	11.0	11.6	12.2	11.5	10.5	9.5	8.8	8.4	8.1	8.2	7.1	8.6
Wilmington, N. C.	7.4	7.7	7.6	7.5	8.1	8.4	8.0	8.0	8.9	9.1	10.0	10.3	11.2	11.3	11.5	10.7	9.9	8.4	8.3	8.9	8.4	8.4	8.0	8.0	8.9
Winnemucca, Nev.	7.9	8.4	8.4	9.4	9.2	8.5	8.2	8.5	9.2	9.2	9.2	10.3	9.9	9.8	10.2	10.8	10.6	10.5	10.4	9.2	7.5	8.0	8.0	7.5	9.1
Woods Hole, Mass.	15.2	15.3	15.5	15.8	14.9	14.8	14.3	13.2	13.7	13.6	13.7	14.1	15.4	15.5	14.9	14.1	13.8	14.7	14.8	15.1	15.7	14.8	14.4	14.6	14.7
Yuma, Ariz.	4.1	4.0	4.8	4.5	5.0	5.6	5.1	6.0	6.1	5.6	5.9	8.2	10.2	10.7	10.7	10.6	10.2	9.9	8.9	6.9	5.7	5.1	5.0	4.3	6.8

TABLE VII.—*Heights of rivers above low-water mark, November, 1895.*

Stations.	Distance to mouth of river.	Danger-point on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn [1]	2,057	14.0	1.5	{6, 9, 12, {15, 16, 20}	0.5	24	.2	1.0
La Crosse, Wis	1,867	10.0	1.7	1	1.3	26-27	1.4	0.4
Dubuque, Iowa	1,759	15.0	1.2	1-6, 8-10, 20	— 0.6	28	0.9	1.8
Davenport, Iowa	1,653	15.0	0.8	1	— 0.2	30	0.5	1.0
Keokuk, Iowa	1,523	14.0	0.3	7-10	— 0.7	28	0.1	1.0
Hannibal, Mo.	1,402	17.0	0.8	1-3, 7-9	— 0.2	28	0.5	1.0
St. Louis, Mo.	1,321	30.0	2.8	10-11	2.2	30	2.5	0.6
Memphis, Tenn	910	33.0	— 0.2	30	— 2.7	9	—2.2	2.5
Helena, Ark	834	37.0	0.0	30	— 3.0	8, 9	—2.3	3.0
Arkansas City, Ark.	702	42.0	0.7	30	— 3.3	9, 10	—2.5	2.6
Greenville, Miss	662	40.0	0.5	30	— 2.5	9-11	—2.0	2.0
Vicksburg, Miss	541	41.0	— 4.9	30	— 6.3	13, 14	—5.7	1.4
New Orleans, La	108	13.0	3.7	7-9	2.2	30	2.9	1.5
Illinois River.								
Beardstown, Ill [2]	76	12.0	6.6	20	6.3	1-6	6.4	0.3
Missouri River.								
Pierre, S. Dak [3]	1,132	13.0	1.4	6, 7	— 1.0	21	0.7	2.4
Sioux City, Iowa [4]	802	18.7	5.7	1-3	5.5	6-10, 19	5.6	0.2
Omaha, Nebr.	667	18.0						
Kansas City, Mo.	386	21.0	6.4	25	4.0	30	5.7	2.4
Ohio River.								
Parkersburg, W. Va.	786	38.0	9.7	30	0.5	7	2.4	9.2
Catlettsburg, Ky	652	50.0	6.0	30	1.0	1, 2	2.3	5.0
Cincinnati, Ohio	500	45.0	5.4	23	2.4	1-8	3.4	3.0
Louisville, Ky.	368	24.0	4.1	27	1.8	1-8	2.3	2.3
Evansville, Ind.	184	30.0	7.1	28	— 0.3	7, 8	1.1	7.4
Paducah, Ky.	47	40.0	4.1	30	— 0.7	1-4	0.4	4.8
Cairo, Ill.	1,140*	40.0	6.0	30	1.1	5, 6	2.2	4.9
Monongahela River.								
Pittsburg, Pa.	966†	22.0	7.1	27	4.4	30	5.7	2.7
Great Kanawha River.								
Charleston, W. Va.	61	30.0	5.1	30	4.4	9, 10	4.4	0.7
Scioto River.								
Circleville, Ohio	65	13.0	0.5	25-30	0.2	1-8	0.3	0.3
Big Sandy River.								
Louisa, Ky.			3.6	16, 20, 26	1.9	1, 9	2.7	1.7
Wabash River.								
Mount Carmel, Ill.	50	15.0	4.2	30	—0.2	7-23	0.3	4.4
Cumberland River.								
Burnside, Ky.	404	50.0	3.4	24	—1.6	8, 9	1.2	5.0
Nashville, Tenn	145	40.0	2.4	30	0.3	1-3	1.3	2.1
Tennessee River.								
Knoxville, Tenn.	640	29.0						
Chattanooga, Tenn.	455	33.0	2.4	14	1.1	1, 9, 22	1.5	1.3
Johnsonville, Tenn.	94	21.0	1.3	20, 21	0.0	1	0.7	1.3
Arkansas River.								
Fort Smith, Ark	351	22.0	5.5	11	1.2	2	2.8	4.3
Little Rock, Ark.	176	33.0	5.4	15, 16	2.7	6-8	3.5	2.7
Red River.								
Shreveport, La.	449	29.2	1.4	19	—3.6	7, 8, 11-15	—1.7	5.0
James River.								
Lynchburg, Va.	251	18.0	0.3	8, 26, 27	0.0	1-6, 17, 22	0.1	0.3
Congaree River.								
Columbia, S. C.		15.0	1.8	11, 12	0.5	21, 22, 24, 25	0.9	1.3
Savannah River.								
Augusta, Ga.	140	32.6	8.3	9	4.5	2	5.9	3.8
Alabama River.								
Montgomery, Ala.	215	48.0	1.6	16, 17	0.3	1	0.8	1.3
Willamette River.								
Portland, Oreg		15.0	2.6	21	—0.4	26	1.1	3.0
Sacramento River.								
Red Bluff, Cal		20.0	1.4	7, 30	0.7	15-27	0.9	0.7
Sacramento, Cal.		28.0	9.0	30	8.4	24-28	8.6	0.6

*To mouth of Mississippi River. †To mouth of Ohio River. [1] Record for 27 days. [2] Record for 30 days. [3] Record for 21 days. [4] Record for 19 days.

TABLE VIII.—*Temperature of the wet-bulb thermometer, November, 1895.*

Stations.	Local time faster or slower than 75th meridian time.	8 A. M.			8 P. M.		
		Max.	Min.	Mean.	Max.	Min.	Mean.
New England.	h. m.	°	°	°	°	°	°
Eastport, Me	32 F.	52	12	37	54	15	37
Portland, Me	19 F.	56	14	35	57	19	39
Northfield, Vt	9 F.	59	4	29	56	9	32
Boston, Mass	16 F.	62	20	40	64	23	43
Nantucket, Mass	20 F.	58	24	46	58	26	45
Woods Hole, Mass	17 F.	.....	.....	.....	59	27	45
Block Island, R. I	14 F.	57	23	44	59	29	45
New Haven, Conn	8 F.	58	21	39	60	23	42
Middle Atlantic States.							
Albany, N. Y	5 F.	60	20	37	63	20	38
New York, N. Y	4 F.	63	24	42	61	24	43
Harrisburg, Pa	7 S.	64	23	39	65	25	42
Philadelphia, Pa	0	66	23	41	65	26	44
Baltimore, Md	6 S.	65	26	41	64	29	43
Washington, D. C	8 S.	65	25	40	64	28	43
Lynchburg, Va	16 S.	64	25	41	66	28	45
Norfolk, Va	5 S.	67	28	48	68	34	49
South Atlantic States.							
Charlotte, N. C	23 S.	64	26	43	67	28	47
Hatteras, N. C	2 S.	72	33	55	71	37	55
Kittyhawk, N. C	3 S.	69	30	52	69	34	53
Raleigh, N. C	14 S.	66	27	44	68	29	48
Wilmington, N. C	12 S.	70	30	49	69	35	52
Charleston, S. C	20 S.	68	34	51	69	39	55
Augusta, Ga	27 S.	66	30	46	67	33	50
Savannah, Ga	24 S.	69	33	50	70	37	54
Jacksonville, Fla	26 S.	68	34	54	71	40	57
Florida Peninsula.							
Jupiter, Fla	20 S.	75	45	68	74	49	68
Key West, Fla	27 S.	76	55	70	77	59	70
Tampa, Fla	30 S.	73	41	60	74	47	61
Eastern Gulf States.							
Atlanta, Ga	37 S.	63	27	45	65	30	50
Pensacola, Fla	49 S.	70	30	50	71	39	56
Mobile, Ala	52 S.	69	30	49	69	39	55
Montgomery, Ala	45 S.	65	26	46	66	35	51
Meridian, Miss	55 S.	68	26	45	68	34	50
Vicksburg, Miss	1 06 S.	66	29	47	67	38	52
New Orleans, La	1 00 S.	69	34	52	69	41	56
Western Gulf States.							
Shreveport, La	1 14 S.	64	28	46	66	35	51
Fort Smith, Ark	1 17 S.	59	32	40	61	28	46
Little Rock, Ark	1 08 S.	63	28	42	65	33	48
Corpus Christi, Tex	1 30 S.	70	35	56	72	43	60
Galveston, Tex	1 19 S.	68	34	56	70	44	58
Palestine, Tex	1 22 S.	65	27	45	67	33	51
San Antonio, Tex	1 34 S.	67	30	48	68	37	53
Ohio Valley and Tenn.							
Chattanooga, Tenn	41 S.	63	27	42	64	31	47
Knoxville, Tenn	36 S.	63	26	40	63	28	46
Memphis, Tenn	1 00 S.	64	27	43	66	31	48
Nashville, Tenn	47 S.	63	23	41	65	30	46
Lexington, Ky	38 S.	61	21	38	63	25	42
Louisville, Ky	43 S.	61	23	38	65	26	43
Indianapolis, Ind	44 S.	57	18	36	61	20	39
Cincinnati, Ohio	38 S.	59	20	36	62	26	41
Columbus, Ohio	32 S.	58	18	36	60	26	40
Pittsburg, Pa	20 S.	61	22	39	67	23	43
Parkersburg, W. Va	26 S.	62	23	36	64	26	42
Lower Lake Region.							
Buffalo, N. Y	15 S.	56	14	35	56	19	37
Oswego, N. Y	6 S.	59	18	35	55	21	36
Rochester, N. Y	11 S.	58	16	35	56	16	36
Erie, Pa	20 S.	59	22	36	59	20	38
Cleveland, Ohio	27 S.	60	19	35	61	21	38
Sandusky, Ohio	30 S.	56	14	34	59	23	38
Toledo, Ohio	34 S.	55	15	33	61	22	36
Detroit, Mich	32 S.	54	10	32	59	18	36
Upper Lake Region.							
Alpena, Mich	34 S.	44	7	29	54	9	32
Grand Haven, Mich	45 S.	52	14	32	54	20	35
Marquette, Mich	49 S.	48	10	28	48	13	30
Port Huron, Mich	30 S.	48	10	31	57	15	34
Sault Ste. Marie, Mich	37 S.	45	0	26	46	6	28
Chicago, Ill	50 S.	52	14	32	52	10	34
Milwaukee, Wis	51 S.	54	12	30	50	10	33

Stations.	Local time faster or slower than 75th meridian time.	8 A. M.			8 P. M.		
		Max.	Min.	Mean.	Max.	Min.	Mean.
Up. Lake Region—Con.	h. m.	°	°	°	°	°	°
Green Bay, Wis	52 S.	45	7	27	50	9	31
Duluth, Minn	08 S.	45	— 1	24	47	9	28
North Dakota.							
Moorhead, Minn	1 27 S.	36	—11	19	40	0	23
St. Vincent, Minn	1 29 S.	36	—15	14	35	— 1	19
Bismarck, N. Dak	1 42 S.	36	—10	16	39	— 4	20
Williston, N. Dak	1 54 S.	36	—11	16	40	— 6	19
Upper Mississippi Valley.							
St. Paul, Minn	1 12 S.	54	— 4	25	49	8	30
La Crosse, Wis	1 05 S.	50	6	27	56	11	32
Davenport, Iowa	1 02 S.	48	13	31	56	11	34
Des Moines, Iowa	1 14 S.	53	1	29	56	15	34
Keokuk, Iowa	1 06 S.	49	9	31	58	18	36
Cairo, Ill	56 S.	60	22	39	64	27	44
Springfield, Ill	58 S.	55	16	32	58	12	36
Hannibal, Mo	1 05 S.	57	12	33	58	16	38
St. Louis, Mo	1 01 S.	59	18	36	62	22	40
Missouri Valley.							
Columbia, Mo	1 09 S.	.....	.....	.....	57	16	38
Kansas City, Mo	1 18 S.	54	10	35	61	19	40
Springfield, Mo	1 13 S.	58	16	36	60	21	40
Omaha, Nebr	1 24 S.	56	4	30	54	18	36
Sioux City, Iowa	1 26 S.	56	2	26	52	11	31
Pierre, S. Dak	1 41 S.	42	2	22	45	11	29
Huron, S. Dak	1 32 S.	55	— 3	21	46	5	27
Northern Slope.							
Havre, Mont	2 19 S.	45	0	24	46	4	27
Miles City, Mont	2 03 S.	43	— 5	23	48	9	29
Helena, Mont	2 28 S.	45	1	26	50	6	29
Rapid City, S. Dak	1 53 S.	43	4	28	47	5	28
Cheyenne, Wyo	1 59 S.	42	— 2	25	42	— 1	27
Lander, Wyo	2 15 S.	36	— 8	16	40	— 2	21
North Platte, Nebr	1 43 S.	41	0	25	46	10	33
Middle Slope.							
Denver, Colo	2 00 S.	37	6	24	41	10	32
Pueblo, Colo	1 58 S.	38	10	24	43	14	33
Concordia, Kans	1 31 S.	54	5	30	55	16	36
Dodge City, Kans	1 40 S.	52	10	30	59	14	37
Wichita, Kans	1 29 S.	57	14	34	61	22	41
Oklahoma, Okla	1 30 S.	62	12	37	63	26	44
Southern Slope.							
Abilene, Tex	1 39 S.	62	17	40	65	28	46
Amarillo, Tex	1 47 S.	42	15	30	50	17	38
Southern Plateau.							
El Paso, Tex	2 06 S.	49	28	35	50	36	44
Santa Fe, N. Mex	2 04 S.	38	9	25	39	16	30
Phœnix, Ariz	2 28 S.	57	35	45	60	45	53
Yuma, Ariz	2 38 S.	56	34	44	59	42	52
Independence, Cal	2 53 S.	42	22	32	48	30	39
Middle Plateau.							
Carson City, Nev	2 59 S.	39	15	28	46	28	37
Winnemucca, Nev	2 51 S.	36	7	21	44	21	34
Salt Lake City, Utah	2 27 S.	41	22	31	44	28	35
Northern Plateau.							
Baker City, Oreg	2 51 S.	38	10	25	44	22	33
Idaho Falls, Idaho	2 28 S.	36	6	22	40	13	28
Spokane, Wash	2 49 S.	48	13	31	49	24	36
Walla Walla, Wash	2 53 S.	50	23	37	54	28	42
N. Pac. Coast Region.							
Fort Canby, Wash	3 16 S.	51	37	44	54	41	46
Port Angeles, Wash	3 14 S.	51	30	40	54	31	42
Seattle, Wash	3 09 S.	54	30	41	56	36	44
Tatoosh Island, Wash	3 19 S.	52	38	44	54	35	45
Portland, Oreg	3 11 S.	54	28	39	57	33	43
Roseburg, Oreg	3 13 S.	51	32	36	55	34	43
Mid. Pac. Coast Region.							
Eureka, Cal	3 17 S.	50	35	44	57	45	49
Red Bluff, Cal	3 09 S.	52	30	41	58	38	48
Sacramento, Cal	3 06 S.	50	30	42	58	40	51
San Francisco, Cal	3 10 S.	55	41	48	60	42	51
S. Pac. Coast Region.							
Fresno, Cal	2 59 S.	48	28	40	55	40	49
Los Angeles, Cal	2 53 S.	53	33	45	60	42	53
San Diego, Cal	2 49 S.	55	38	47	62	47	55
San Luis Obispo, Cal	3 03 S.	52	37	42	55	41	51

TABLE IX.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during November, 1895.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	16	18	13	28	s. 82 w.	15
Portland, Me	23	20	6	28	n. 82 w.	22
Northfield, Vt	16	34	2	23	s. 49 w.	38
Boston, Mass	18	12	8	31	n. 75 w.	34
Nantucket, Mass	18	17	19	19	n.	1
Woods Hole, Mass.*	8	16	5	9	s. 27 w.	9
Block Island, R. I	21	16	14	26	n. 67 w.	13
New Haven, Conn	30	15	8	18	n. 34 w.	18
Middle Atlantic States.						
Albany, N. Y	23	24	5	13	s. 82 w.	8
New York, N. Y	19	19	17	16	e.	1
Harrisburg, Pa	17	11	30	21	n. 9 w.	6
Philadelphia, Pa	25	16	14	17	n. 18 w.	10
Baltimore, Md	30	10	16	14	n. 6 e.	20
Washington, D. C	29	14	12	14	n. 8 w.	15
Lynchburg, Va	22	17	24	15	n. 61 e.	10
Norfolk, Va	31	15	15	14	n. 3 e.	16
South Atlantic States.						
Charlotte, N. C	22	18	33	4	n. 82 e.	29
Hatteras, N. C	33	11	14	16	n. 5 w.	22
Kittyhawk, N. C	27	15	16	21	n. 23 w.	13
Raleigh, N. C	30	16	10	14	n. 16 w.	15
Wilmington, N. C	29	13	17	19	n. 7 w.	16
Charleston, S. C	31	11	19	12	n. 19 e.	21
Augusta, Ga	28	13	9	21	n. 39 w.	19
Savannah, Ga	30	14	13	16	n. 11 w.	16
Jacksonville, Fla	37	5	15	14	n. 2 e.	32
Florida Peninsula.						
Jupiter, Fla	30	13	16	12	n. 13 e.	18
Key West, Fla	38	3	30	3	n. 38 e.	44
Tampa, Fla	46	3	10	11	n. 1 w.	43
Eastern Gulf States.						
Atlanta, Ga	23	12	23	30	n. 15 e.	11
Pensacola, Fla	30	11	22	11	n. 30 e.	22
Mobile, Ala	34	12	13	11	n. 5 e.	22
Montgomery, Ala	32	11	27	14	n. 31 e.	25
Meridian, Miss	25	16	23	9	n. 57 e.	17
Vicksburg, Miss	18	21	29	8	s. 82 e.	21
New Orleans, La	26	13	29	8	n. 59 e.	25
Western Gulf States.						
Shreveport, La	16	26	19	17	s. 11 e.	10
Fort Smith, Ark	12	9	29	16	n. 77 e.	13
Little Rock, Ark	21	20	16	14	n. 63 e.	2
Corpus Christi, Tex	25	17	30	14	n. 37 e.	10
Galveston, Tex	22	18	23	12	n. 73 e.	14
Palestine, Tex	23	24	16	12	s. 76 e.	4
San Antonio, Tex	31	15	18	12	n. 21 e.	17
Ohio Valley and Tennessee.						
Chattanooga, Tenn	19	20	14	19	s. 79 w.	5
Knoxville, Tenn	29	7	17	17	n.	22
Memphis, Tenn	20	21	21	11	s. 84 e.	10
Nashville, Tenn	15	21	19	19	s.	6
Lexington, Ky	10	26	20	16	s. 14 e.	16
Louisville, Ky	15	23	23	10	s. 58 e.	15
Indianapolis, Ind	13	27	24	15	s. 33 e.	17
Cincinnati, Ohio	17	26	25	8	s. 62 e.	19
Columbus, Ohio	14	18	23	14	s. 66 e.	10
Pittsburg, Pa	15	21	16	21	s. 40 w.	8
Parkersburg, W. Va	13	18	21	14	s. 54 e.	9
Lower Lake Region.						
Buffalo, N. Y	12	26	16	23	s. 27 w.	16
Oswego, N. Y	11	30	12	14	s. 6 w.	19
Rochester, N. Y	8	26	9	30	s. 49 w.	28
Erie, Pa	12	33	9	18	s. 23 w.	23
Cleveland, Ohio	8	28	27	15	s. 31 e.	23
Sandusky, Ohio	15	28	10	21	s. 40 w.	17
Toledo, Ohio	16	27	10	23	s. 50 w.	17
Detroit, Mich	18	27	3	26	s. 09 w.	25
Upper Lake Region.						
Alpena, Mich	16	25	8	25	s. 62 w.	19
Grand Haven, Mich	19	21	26	11	s. 82 e.	15
Marquette, Mich	17	21	5	27	s. 80 w.	22
Port Huron, Mich	15	29	11	17	s. 23 w.	15
Sault Ste. Marie, Mich	16	24	28	13	s. 62 e.	17
Chicago, Ill	23	25	6	17	s. 80 w.	11

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
Upper Lake Region—Cont'd.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Milwaukee, Wis	19	23	6	23	s. 77 w.	18
Green Bay, Wis	17	27	8	22	s. 54 w.	17
Duluth, Minn	19	30	7	30	s. 88 w.	23
North Dakota.						
Moorhead, Minn	19	19	5	24	w.	19
St. Vincent, Minn	24	15	7	25	n. 63 w.	20
Bismarck, N. Dak	30	11	13	25	n. 32 w.	22
Williston, N. Dak	21	19	12	21	n. 77 w.	9
Upper Mississippi Valley.						
St. Paul, Minn	15	24	18	23	s. 29 w.	10
La Crosse, Wis	21	29	3	10	s. 41 w.	11
Davenport, Iowa	18	19	17	19	s. 63 w.	2
Des Moines, Iowa	21	22	16	14	s. 63 e.	2
Keokuk, Iowa	21	23	12	17	s. 68 w.	5
Cairo, Ill	20	25	11	13	s. 22 w.	5
Springfield, Ill	20	30	5	15	s. 45 w.	14
Hannibal, Mo	16	26	13	15	s. 11 w.	10
St. Louis, Mo	19	23	17	14	s. 37 e.	5
Missouri Valley.						
Columbia, Mo.*	10	13	11	5	s. 63 e.	7
Kansas City, Mo	21	27	14	9	s. 40 e.	9
Springfield, Mo	18	28	18	11	s. 35 e.	12
Omaha, Nebr	25	21	14	11	n. 37 e.	5
Sioux City, Iowa	23	24	15	11	s. 76 e.	4
Pierre, S. Dak	22	16	13	18	n. 40 w.	8
Huron, S. Dak	19	19	20	19	e.	1
Northern Slope.						
Havre, Mont	24	13	9	31	n. 64 w.	25
Miles City, Mont	15	24	12	18	s. 34 w.	11
Helena, Mont	13	20	2	30	s. 81 w.	38
Rapid City, S. Dak	12	12	6	37	w.	31
Cheyenne, Wyo	27	9	5	36	n. 60 w.	36
Lander, Wyo	14	24	5	27	s. 66 w.	24
North Platte, Nebr	17	13	7	33	n. 81 w.	26
Middle Slope.						
Denver, Colo	15	24	14	17	s. 18 w.	10
Pueblo, Colo	26	12	16	20	n. 16 w.	15
Concordia, Kans	19	27	7	16	s. 48 w.	12
Dodge City, Kans	29	17	15	16	n. 5 w.	12
Wichita, Kans	23	29	6	9	s. 27 w.	7
Oklahoma, Okla	22	30	6	12	s. 37 w.	10
Southern Slope.						
Abilene, Tex	22	26	7	13	s. 56 w.	7
Amarillo, Tex	20	27	3	22	s. 70 w.	20
Southern Plateau.						
El Paso, Tex	19	5	19	28	n. 33 w.	17
Santa Fe, N. Mex	22	18	28	12	n. 74 e.	15
Phœnix, Ariz	4	40	19	15	s. 6 e.	36
Yuma, Ariz	36	7	18	11	n. 14 e.	30
Independence, Cal	27	14	2	35	n. 69 w.	36
Middle Plateau.						
Carson City, Nev	22	16	15	19	n. 34 w.	7
Winnemucca, Nev	23	14	20	17	n. 18 e.	10
Salt Lake City, Utah	13	26	20	15	s. 21 e.	14
Northern Plateau.						
Baker City, Oreg	15	30	9	20	s. 36 w.	19
Idaho Falls, Idaho	21	26	5	12	s. 54 w.	9
Spokane, Wash	12	28	10	23	s. 43 w.	19
Walla Walla, Wash	7	38	8	12	s. 7 w.	31
North Pacific Coast Region.						
Fort Canby, Wash	19	19	21	11	e.	10
Port Angeles, Wash	2	46	13	10	s. 4 e.	44
Seattle, Wash	18	31	16	7	s. 35 e.	16
Tatoosh Island, Wash	2	17	36	11	s. 59 e.	29
Portland, Oreg	17	23	23	17	s. 45 e.	8
Roseburg, Oreg	12	23	21	18	s. 15 e.	11
Middle Pacific Coast Region.						
Eureka, Cal	14	19	21	18	s. 31 e.	6
Red Bluff, Cal	36	9	7	22	n. 29 w.	31
Sacramento, Cal	22	24	20	6	s. 82 e.	14
San Francisco, Cal	26	6	9	28	n. 44 w.	26
South Pacific Coast Region.						
Fresno, Cal	17	4	27	22	n. 21 e.	14
Los Angeles, Cal	25	4	18	23	n. 13 w.	22
San Diego, Cal	26	5	18	25	n. 18 w.	22
San Luis Obispo, Cal	38	8	5	14	n. 17 w.	31

* From observations at 8 p. m. only.

TABLE X.—*Thunderstorms and auroras, November, 1895.*

States.	No. of stations.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total. No.	Total. Days.	
Alabama	55	T.																																0	0	T.
		A.																																0	0	A.
Arizona	43	T.	1	1	1								2	1									1	1										7	6	T.
		A.																																0	0	A.
Arkansas	50	T.								1														1	1		4				1		8	5	T.
		A.																																0	0	A.
California	195	T.			1																			1										2	2	T.
		A.													1																			1	1	A.
Colorado	86	T.				3			1															1										5	3	T.
		A.								2	1	1																						4	3	A.
Connecticut	22	T.																										13						13	2	T.
		A.										1		1																				2	2	A.
Delaware	7	T.																										4						4	1	T.
		A.																			1													1	1	A.
Dist. of Columbia	4	T.																																1	0	T.
		A.																																0	0	A.
Florida	36	T.	5				2	2	1	4	1	1									1													17	8	T.
		A.																																0	0	A.
Georgia	58	T.						1	1	1																	1	1						5	5	T.
		A.																																0	0	A.
Idaho	32	T.																											1					1	1	T.
		A.									1																							1	1	A.
Illinois	92	T.						1																							1			2	2	T.
		A.	1			1					13	1											1		1			1						19	7	A.
Indiana	44	T.																																0	0	T.
		A.									3																							3	1	A.
Indian Territory	8	T.																							1									1	1	T.
		A.																																0	0	A.
Iowa	96	T.				1	1																											2	2	T.
		A.									20	3													2									25	3	A.
Kansas	68	T.					1																											1	1	T.
		A.									6																1							7	2	A.
Kentucky	40	T.																							5									5	1	T.
		A.																																0	0	A.
Louisiana	56	T.																								2	4							6	2	T.
		A.																																0	0	A.
Maine	19	T.															1																	1	1	T.
		A.										1	3	2																				6	3	A.
Maryland	36	T.																	2								1	7						10	3	T.
		A.									3				1																			4	2	A.
Massachusetts	83	T.															12											3						15	2	T.
		A.								1		2	4	4	1							1	1						1					15	8	A.
Michigan	85	T.																																0	0	T.
		A.									9	5	3	2											1									20	5	A.
Minnesota	70	T.					9				1	1		1																				12	4	T.
		A.								1	19	11	5	5		1		1						2	7									52	9	A.
Mississippi	51	T.																								1	1		1			1		4	4	T.
		A.																																0	0	A.
Missouri	96	T.						1																	2		3							6	3	T.
		A.									5	1																	1					7	3	A.
Montana	36	T.		2																														2	1	T.
		A.		1	1						4	2	3	1			1								3					1				17	9	A.
Nebraska	125	T.				2	4																											6	2	T.
		A.									13	3													2	1								19	4	A.
Nevada	51	T.																																0	0	T.
		A.																											1			1		2	2	A.
New Hampshire	24	T.																																0	0	T.
		A.										1	6	3	1											1								12	5	A.
New Jersey	53	T.																1	4									18	1					24	4	T.
		A.									7	1	1										1		1									11	5	A.
New Mexico	33	T.												1																				1	1	T.
		A.																																0	0	A.
New York	81	T.																										6	1					7	2	T.
		A.	1		1	1		1				3	1						1		1													10	8	A.
North Carolina	53	T.							2	2			1															1						6	4	T.
		A.										1																						1	1	A.
North Dakota	36	T.					1																											1	1	T.
		A.					1				10	10	2				2	1							2									28	7	A.
Ohio	139	T.																							2		1							3	2	T.
		A.						1				2	1		1								2											7	5	A.
Oklahoma	30	T.					1		1															1										3	3	T.
		A.																																0	0	A.
Oregon	65	T.																					1				1			1	3	1		7	5	T.
		A.																																0	0	A.
Pennsylvania	104	T.																										2						2	1	T.
		A.																																0	0	A.
Rhode Island	8	T.															1																	1	1	T.
		A.																																0	0	A.
South Carolina	40	T.						2	2	1		1															1	2						9	6	T.
		A.																																0	0	A.
South Dakota	44	T.					9																											9	1	T.
		A.								1	7	7	2			1	1								1									20	7	A.
Tennessee	45	T.																			1						1							2	2	T.
		A.																																0	0	A.
Texas	90	T.					1					1												1	1	2	3							9	6	T.
		A.																																0	0	A.
Utah	34	T.				1																												1	1	T.
		A.																																0	0	A.
Vermont	16	T.																																0	0	T.
		A.										1	3		1																1			6	4	A.
Virginia	38	T.																	2		2						1	2						7	4	T.
		A.																																0	0	A.
Washington	48	T.														1													3	1				5	3	T.
		A.										1												1	1									3	3	A.
West Virginia	38	T.																			2													2	1	T.
		A.																																0	0	A.
Wisconsin	59	T.																																0	0	T.
		A.								1	18	8	3	1		1	1		1						7									41	9	A.
Wyoming	11	T.																																0	0	T.
		A.									3																							3	1	A.
Sums	2,726	T.	5	3	2	7	29	7	8	9	2	3	3	4	0	1	14	1	8	0	5	0	2	5	13	5	22	59	7	2	4	3	....	234	....	T.
		A.	2	1	2	2	1	2	0	6	142	63	39	21	5	3	5	2	2	0	2	2	4	3	28	2	1	1	2	1	1	2	....	347	....	A.

TABLE XI.—*Hourly sunshine as deduced from sunshine recorders, November, 1895.*

Stations.	Instrument.	Percentages for each hour of local mean time ending with the respective hour.																Monthly summary.			
		A. M.								P. M.								Instrumental record.			Personal estimate.
		5	6	7	8	9	10	11	Noon.	1	2	3	4	5	6	7	8	Actual.	Possible.	Per cent of possible.	
																		Hours.	*Hours.*		
Atlanta, Ga	T.	.....	.....	32	37	59	73	78	74	79	77	68	63	47	33	.....	.....	300.6	312.3	64	58
Baltimore, Md	T.	.....	.....	19	37	31	40	48	50	54	60	57	47	46	.....	.....	.....	136.3	300.7	45	49
Bismarck, N. Dak	P.	.....	.....	11	4	11	20	28	38	28	28	24	11	0	.....	.....	.....	54.5	281.2	19	31
Boston, Mass	T.	.....	.....	12	17	22	37	43	46	48	47	45	39	32	.....	.....	.....	109.8	293.7	37	34
Buffalo, N. Y	T.	.....	.....	14	16	27	39	43	42	43	40	34	19	7	.....	.....	.....	92.7	292.1	32	26
Chicago, Ill	T.	.....	.....	31	37	37	38	46	51	52	50	47	35	37	.....	.....	.....	121.2	294.9	41	31
Cincinnati, Ohio	P.	.....	.....	44	41	41	37	48	44	44	43	38	22	22	.....	.....	.....	123.0	301.4	41	37
Cleveland, Ohio	T.	.....	.....	29	25	30	38	39	31	31	28	50	31	36	.....	.....	.....	84.2	296.2	28	32
Columbus, Ohio	P.	.....	.....	37	19	48	57	54	61	59	51	50	31	16	.....	.....	.....	135.3	299.7	45	31
Denver, Colo	T.	.....	.....	64	57	69	78	81	79	59	66	72	68	56	.....	.....	.....	203.9	300.1	68	53
Des Moines, Iowa	P.	.....	.....	45	38	42	44	48	51	54	51	42	39	35	.....	.....	.....	132.0	295.5	45	32
Detroit, Mich	T.	.....	.....	56	43	47	54	61	65	60	56	44	40	35	.....	.....	.....	149.9	294.1	51	40
Dodge City, Kans	P.	.....	.....	56	59	68	69	73	72	72	72	67	73	67	.....	.....	.....	209.6	304.1	69	64
Eastport, Me	P.	.....	.....	29	20	29	36	36	38	41	45	45	43	38	.....	.....	.....	107.2	287.0	37	30
Eureka, Cal	P.	.....	.....	44	40	52	61	62	71	74	78	73	50	42	19	.....	.....	188.7	297.7	63	58
Galveston, Tex	P.	.....	.....	17	27	47	56	59	54	52	58	54	42	30	37	.....	.....	153.6	321.2	48	46
Helena, Mont	P.	.....	.....	10	17	23	38	43	47	48	53	42	39	37	38	.....	.....	107.2	281.6	38	34
Kansas City, Mo	T.	.....	.....	45	40	43	51	60	64	66	59	56	49	48	50	.....	.....	136.5	301.6	45	44
Little Rock, Ark	T.	.....	.....	48	43	47	50	42	40	36	36	37	37	34	.....	.....	.....	167.2	310.7	54	43
Louisville, Ky	T.	.....	.....	33	37	30	26	67	70	73	66	66	47	33	30	.....	.....	104.5	303.3	34	29
New Orleans, La	T.	.....	.....	38	38	57	69	54	60	62	62	58	51	31	.....	.....	.....	181.7	319.9	57	56
New York, N. Y	T.	.....	.....	30	33	40	49	56	58	60	61	58	52	52	.....	.....	.....	188.7	297.7	49	44
Philadelphia, Pa	P.	.....	.....	30	39	40	46	56	58	80	83	79	79	74	71	.....	.....	146.3	297.6	52	43
Phœnix, Ariz	T.	.....	.....	65	74	84	87	93	90	80	79	79	74	68	.....	.....	.....	154.8	299.3	52	43
Portland, Me	T.	.....	.....	0	10	40	54	58	61	60	56	52	52	38	.....	.....	.....	255.2	313.2	81	70
Portland, Oreg	P.	.....	.....	37	18	17	18	30	40	38	42	33	25	25	.....	.....	.....	140.4	290.5	48	38
Do	P.	.....	.....	37	18	18	23	38	36	36	44	44	33	37	.....	.....	.....	82.4	285.7	29	34
Rochester, N. Y	T.	.....	.....	39	22	41	49	59	59	55	50	47	31	23	.....	.....	.....	89.3	285.7	31	34
St. Louis, Mo	T.	.....	.....	31	29	49	53	58	59	57	59	62	50	32	.....	.....	.....	132.5	292.1	45	36
Salt Lake City, Utah	P.	.....	.....	37	37	38	63	57	58	49	56	52	51	46	57	22	.....	153.9	302.3	51	35
San Diego, Cal	P.	.....	.....	67	70	77	84	87	84	83	80	83	77	67	42	.....	.....	147.8	297.4	50	34
San Francisco, Cal	P.	.....	.....	0	24	52	73	79	81	90	86	83	74	75	64	33	.....	244.5	314.3	78	70
Santa Fe, N. Mex	P.	.....	.....	71	64	72	71	70	64	72	57	54	53	36	15	.....	.....	200.8	304.4	66	63
Savannah, Ga	T.	.....	.....	38	44	53	56	56	58	57	54	69	60	53	55	.....	.....	216.7	308.8	70	65
Vicksburg, Miss	P.	.....	.....	41	42	53	62	67	65	64	66	58	55	45	.....	.....	.....	163.1	315.8	52	50
Washington, D. C	T.	.....	.....	30	37	36	44	48	45	51	57	57	53	34	0	.....	.....	186.6	315.2	59	55
Wilmington, N. C	T.	.....	.....	5	30	48	53	60	60	65	62	59	53					139.1	305.5	46	52
																		156.8	311.4	50	48

TABLE XII.—*Hourly precipitation, November, 1895.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Total.
Atlanta, Ga *	0.13	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.07	T.	T.	0.00	0.00	0.00	T.	T.	0.13	0.05	0.06	0.04	0.03	0.06	0.98
Baltimore, Md *	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bismarck, N. Dak *	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston, Mass	0.95	0.75	0.67	0.35	0.25	0.64	0.07	0.03	0.10	0.02	0.02	0.07	0.05	0.21	0.13	0.08	0.31	0.40	0.39	0.25	0.31	0.22	0.40	0.27	6.93
Buffalo, N. Y	0.25	0.25	0.27	0.25	0.14	0.08	0.13	0.11	0.23	0.20	0.36	0.16	0.04	0.11	0.16	0.11	0.13	0.19	0.13	0.17	0.30	0.22	0.13	0.15	4.34
Chicago, Ill	0.08	0.24	0.28	0.14	0.18	0.25	0.28	0.26	0.28	0.44	0.30	0.27	0.05	0.07	0.03	0.17	0.06	0.05	0.10	0.08	0.15	0.15	0.17	0.10	4.18
Cincinnati, Ohio	0.45	0.12	0.08	0.16	0.10	0.13	0.13	0.10	0.13	0.02	0.06	0.06	0.09	0.18	0.23	0.36	0.20	0.26	0.52	0.33	0.25	0.11	0.19	0.41	4.57
Cleveland, Ohio	0.10	0.16	0.09	0.20	0.13	0.18	0.10	0.08	0.24	0.26	0.20	0.30	0.06	0.11	0.17	0.40	0.34	0.18	0.21	0.21	0.19	0.18	0.19	0.14	4.42
Denver, Colo *	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit, Mich	0.09	0.05	T.	0.08	0.14	0.12	0.17	0.24	0.23	0.26	0.14	0.21	0.10	0.14	0.25	0.18	0.14	0.16	0.20	0.15	0.12	0.17	0.37	0.23	0.25	4.19
Dodge City, Kans	T.	T.	T.	T.	T.	T.	T.	T.	T.	T.	T.	T.	T.	0.01	T.	T.	T.	T.	0.01	0.07	0.08	0.07	0.06	0.03	0.01	0.34
Duluth, Minn *	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eastport, Me	0.21	0.28	0.24	0.30	0.50	0.33	0.48	1.04	0.54	0.16	0.15	0.30	0.37	0.16	0.03	0.06	0.04	0.07	0.11	0.05	0.19	0.25	0.15	0.16	6.41
Galveston, Tex *	0.58	0.20	0.09	0.07	0.06	0.05	0.08	0.14	0.39	0.08	0.07	0.08	0.05	0.11	0.13	0.13	0.19	0.27	0.23	0.67	0.22	1.35	0.45	0.32	6.01
Indianapolis, Ind	0.24	0.22	0.19	0.07	0.07	0.12	0.12	0.42	0.16	0.20	0.21	0.20	0.18	0.27	0.24	0.17	0.15	0.28	0.37	0.51	0.33	0.29	0.27	0.35	5.63
Jacksonville, Fla	0.15	0.01	0.04	0.12	0.11	0.16	0.24	0.23	0.16	0.19	0.11	0.14	0.13	0.18	0.23	T.	0.19	0.03	T.	0.16	0.08	0.06	0.21	0.19	3.12
Jupiter, Fla	0.18	0.05	0.04	0.01	0.07	0.05	0.16	0.57	1.45	0.39	0.20	0.01	0.90	0.01	0.07	0.07	0.09	0.01	0.01	T.	0.08	0.21	0.22	0.23	4.87
Kansas City, Mo	0.56	0.26	0.26	0.15	0.10	0.21	0.09	0.22	0.08	0.02	0.01	0.01	T.	T.	T.	0.01	0.01	T.	0.42	0.13	0.11	0.06	0.19	0.31	0.03	4.86
Key West, Fla	0.00	0.07	0.00	0.00	0.00	0.00	0.06	0.05	0.02	0.01	0.01	0.07	0.42	0.44	0.36	0.12	0.17	0.09	0.29	0.03	0.01	T.	0.01	0.02	0.00	0.09	0.00	0.36
Little Rock, Ark	0.20	0.23	0.11	0.17	0.07	0.05	0.21	0.12	0.13	0.09	0.14	0.24	0.17	0.37	0.23	0.09	0.26	0.21	0.05	0.03	0.03	0.06	0.08	0.15	0.16	2.99
Louisville, Ky	0.19	0.21	0.16	0.19	0.55	0.19	0.32	0.65	0.14	0.13	0.44	0.50	0.42	0.24	0.09	0.26	0.21	0.05	0.03	0.03	0.06	0.08	0.15	0.16	2.99
Memphis, Tenn	0.09	0.11	0.12	0.07	0.14	0.33	0.17	0.14	0.23	0.33	0.32	0.16	0.13	0.07	0.04	0.04	0.04	0.05	0.19	0.20	0.22	0.14	0.06	0.04	4.67
Milwaukee, Wis *	0.15	0.11	0.10	0.10	0.10	0.30	0.01	0.00	0.03	0.13	0.12	0.15	0.19	0.32	0.19	0.25	0.24	0.32	0.19	0.30	0.01	0.09	0.03	T.	T.	2.12
Nantucket, Mass	0.42	0.69	0.38	0.26	0.06	0.06	0.30	0.31	0.09	0.03	0.04	0.13	0.18	0.13	0.06	0.13	0.07	0.04	0.04	0.07	0.03	0.01	T.	0.01	0.01	0.69
Nashville, Tenn	T.	T.	T.	T.	0.12	0.32	T.	T.	T.	0.00	0.25	0.02	0.02	0.05	0.04	0.07	0.03	0.06	0.07	0.03	0.01	0.20	0.06	0.21	0.51	2.91
New Orleans, La	0.01	0.01	T.	0.01	0.01	0.01	0.01	T.	T.	0.06	0.01	0.06	0.31	0.36	0.04	0.05	0.13	0.04	0.05	0.10	0.20	0.06	0.21	0.51	3.31
New York, N. Y	0.28	0.14	T.	0.01	0.01	0.01	0.01	0.06	0.12	0.09	0.07	0.06	0.31	0.36	0.04	0.05	0.13	0.14	0.17	0.06	0.09	0.07	0.05	0.09	0.05	3.31
Norfolk, Va	0.11	0.14	0.09	0.30	0.44	0.18	0.24	0.26	0.12	0.05	0.01	0.04	0.32	0.16	0.07	0.15	0.14	0.17	0.06	0.03	0.05	0.06	0.04	0.06	1.07
Omaha, Nebr *	0.10	0.07	0.06	0.05	0.03	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.07	0.04	0.05	0.02	0.02	0.02	0.03	0.08	0.02	0.02	0.08	0.01	2.04
Philadelphia, Pa	0.01	0.01	0.01	0.01	0.01	0.02	0.04	0.06	0.04	0.03	0.03	0.01	0.02	0.03	0.05	0.02	0.09	0.27	0.31	0.08	0.02	0.02	0.08	0.01	2.04
Pittsburg, Pa	0.20	0.09	0.05	0.04	0.08	0.11	0.18	0.09	0.03	0.09	0.07	0.23	0.10	0.03	0.05	0.03	0.02	0.02	0.03	0.15	0.14	0.14	0.09	0.18	0.14	2.14
Portland, Me *	0.43	0.63	0.53	0.69	0.43	0.38	0.15	0.07	0.10	0.01	0.05	0.01	0.05	0.04	0.07	0.12	0.20	0.44	0.28	0.20	0.31	0.34	0.70	0.41	5.68
Portland, Oreg	0.12	0.17	0.04	0.06	0.05	0.04	0.03	0.10	0.19	0.22	0.07	0.04	0.10	0.09	0.09	0.14	0.12	0.10	0.23	0.34	0.22	0.17	0.19	0.20	3.12
Rochester, N. Y	0.10	0.10	0.31	0.16	0.09	0.19	0.13	0.12	0.11	0.19	0.29	0.19	0.15	0.09	0.11	0.08	0.06	0.07	0.14	0.13	0.18	0.17	0.08	0.06	3.30
St. Louis, Mo	0.22	0.15	0.11	0.11	0.25	0.10	0.22	0.28	0.09	0.07	0.04	0.08	0.21	0.20	0.09	0.09	0.15	0.13	0.15	0.09	0.36	0.21	0.33	0.20	3.93
St. Paul, Minn	0.02	0.07	0.06	0.09	0.05	0.01	0.09	0.04	T.	0.01	T.	0.01	0.02	0.03	0.01	0.02	0.04	0.03	0.03	0.06	0.03	0.02	0.01	0.02	0.77
Salt Lake City, Utah *	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Diego, Cal	0.02	0.25	0.12	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.01	0.14	0.08	0.19	0.00	0.00	0.11	0.13	0.00	0.00	0.00	1.19
San Francisco, Cal	0.01	T.	T.	T.	T.	0.01	0.02	0.14	0.02	0.05	0.15	0.34	0.25	0.05	T.	T.	0.20	0.16	0.08	0.08	0.01	0.05	0.00	0.12	1.74
Savannah, Ga	0.06	0.09	0.14	0.24	1.15	0.17	0.08	0.05	0.06	0.03	0.11	0.11	0.04	0.06	0.09	0.18	0.42	0.39	0.08	0.05	0.14	0.34	0.71	0.14	3.74
Seattle, Wash	0.04	0.02	T.	0.04	0.16	0.10	0.01	0.01	0.04	0.10	0.07	0.06	0.02	0.06	0.08	0.11	0.10	0.06	0.12	0.28	0.22	0.15	0.08	0.08	2.01
Vicksburg, Miss	0.10	0.07	0.04	0.38	0.26	0.11	0.03	0.27	0.14	0.08	0.09	0.18	0.03	0.15	0.37	0.15	0.04	0.01	0.04	0.01	0.01	0.09	0.04	0.09	2.74
Washington, D. C	0.01	0.13	0.02	0.01	T.	0.09	0.17	0.10	0.07	0.05	0.07	0.06	0.07	0.05	0.05	0.05	0.15	0.04	0.01	0.01	0.01	0.01	T.	T.	1.21
Wilmington, N. C	0.06	0.03	0.13	0.15	0.15	0.07	0.06	0.05	0.03	0.30	0.07	0.11	0.02	0.02	0.02	0.07	0.21	0.19	0.12	0.34	0.28	0.38	0.24	0.22	0.04	3.34

* Record incomplete.

TABLE XIII.—*Excessive precipitation, by stations, for November*, 1895.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
	Inches.	*Inches.*		*Ins.*	*h. m.*	
Arkansas.						
Hot Springs		2.50	24-25			
Madding		2.75	25			
Malvern		3.04	23-24			
Osceola		5.34	24-25			
Rison		2.60	24-25			
Connecticut.						
Hartford		2.99	14-15			
Lake Konomoc		3.48	1			
Southington		3.60	14-15			
Storrs		2.49	14-15			
Voluntown		2.80	1			
Waterbury		3.02	14-15			
Florida.						
Amelia		2.77	5-6			
Frostproof		2.78	5			
Illinois.						
Flora		2.53	25			
Friend Grove		2.90	24-25			
Iron		5.25	24-25			
Indiana.						
Evansville		2.63	7-8			
Indianapolis		2.65	25			
Jasper		3.08	7-8			
Madison		2.54	8-9			
Marengo	13.01	5.00	7-8			
Do		2.50	24			
Seymour		2.60	8			
Kentucky.						
Henderson		2.85	24-25			
Paducah *b*		2.50	25			
Pleasure Ridge Park		3.54	24-25			
Louisiana.						
Abbeville		4.35	23-24			
Cameron	10.10	9.30	23-24			
Elm Hall		2.50	3			
Franklin		3.17	24-25			
Grand Coteau		2.77	24			
Lake Charles	12.57	10.00	23-25			
Melville		2.65	24			
Maine.						
Bar Harbor		2.90	*			
Massachusetts.						
Attleboro		4.18	*			
Beverly Farms		3.13	*			
Blue Hill		2.93	1			
Boston		2.67	1			
Brockton *b*		2.83	*			
Brockton *c*		3.14	*			
Cambridge *a*		2.90	*			
Roxbury	10.44	2.76	*			
Salisbury		2.59	*			
Wakefield		3.00	*			
Webster		2.52	15			
Worcester		2.59	15			

TABLE XIII.—*Excessive precipitation*—Continued.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
	Inches.	*Inches.*		*Ins.*	*h. m.*	
Mississippi.						
Austin		2.55	25			
Natchez		3.00	9			
Missouri.						
Brunswick		2.54	5			
Gordonville		2.98	24-25			
New Madrid		2.64	24-25			
North Carolina.						
Hatteras		2.95	1-2			
Ohio						
Hedges		2.63	8-9			
Pataskala		2.77	8-9			
Wauseon		2.83	25-26			
Oklahoma.						
Anadarko		2.90	6			
Fort Sill		3.97	4-5			
Guthrie		2.63	5-6			
Norman		2.93	5-6			
Oklahoma		2.76	6-7			
Oregon.						
Glenora	13.25					
Nehalem	12.54					
Salmon		2.53	14			
Rhode Island.						
Lonsdale		3.10	*			
Pawtucket		4.21	*			
South Carolina.						
Santuck		3.08	7-8			
Tennessee.						
Covington		5.58	23-25			
Dyersburg		5.79	24-25			
Memphis		2.55	24-25			
Mount Carmel		5.45	23-25			
Trenton		3.50	24-25			
Texas.						
Angleton		5.00	23-24			
Brady		3.35	8-9			
Brazoria		4.22	23-24			
Columbia		4.15	23-24			
Corpus Christi		2.67	23-24			
Galveston		3.77	23-24	1.41	1 00	23
Graham		2.58	8			
Grape Vine		3.01	8			
Stafford		3.25	24			
Sulphur Springs		2.90	8			
Virginia.						
Rockymount		2.60	8			
Washington.						
Monte Cristo	10.92					
Neah Bay	11.55					

* October 31 to November 1.

TABLE XIV.—*Maximum rainfall in one hour or less, November*, 1895.

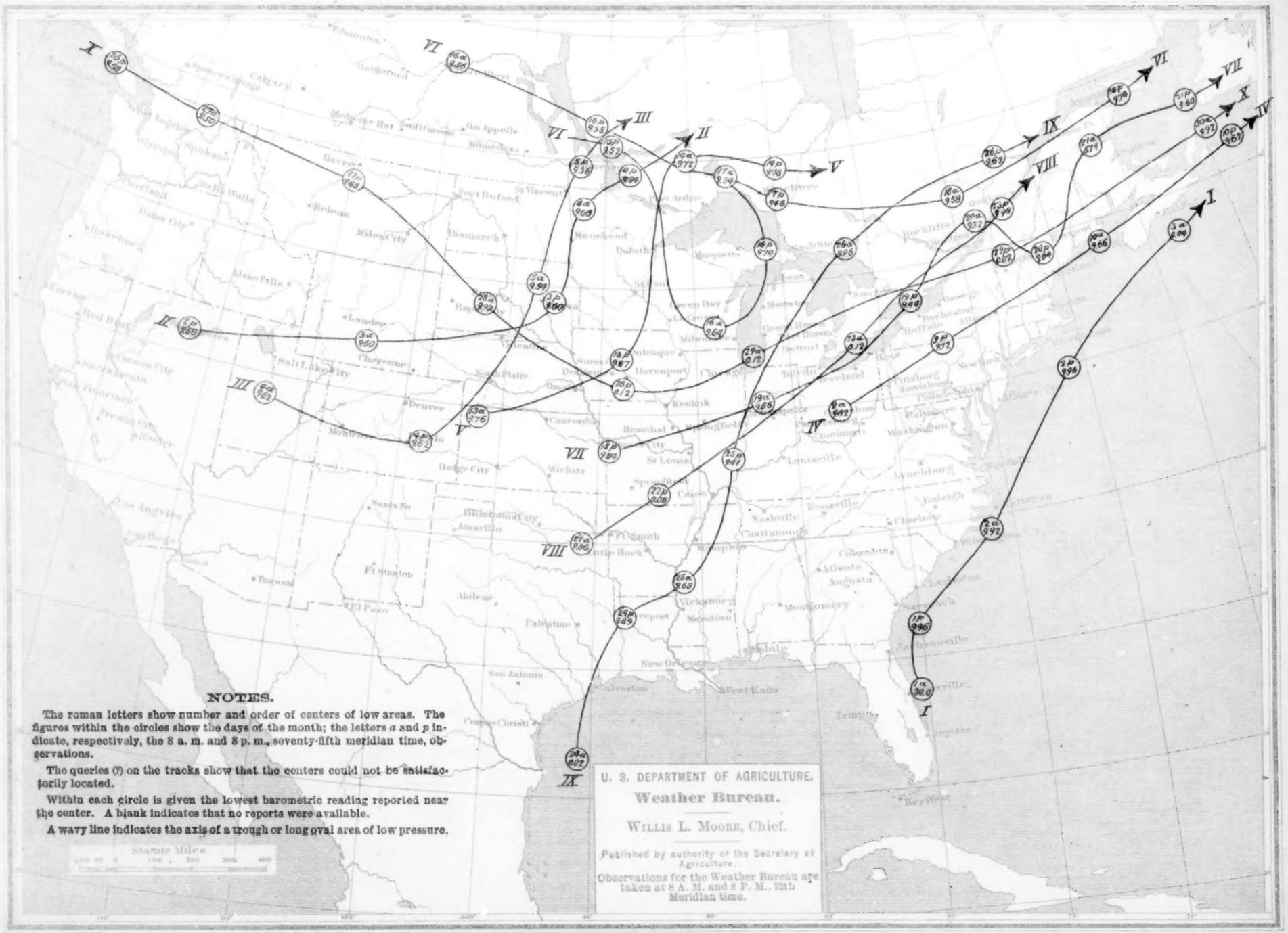
Stations.	Maximum rainfall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		*Inch.*		*Inch.*	
Atlanta, Ga. *	0.04	19	0.07	19	0.12	19
Bismarck, N. Dak. *						
Boston, Mass.	0.14	15	0.25	15	0.78	1
Buffalo, N. Y.	0.08	8	0.10	8	0.23	8, 26
Chicago, Ill.	0.07	7	0.10	7	0.22	7
Cincinnati, Ohio	0.06	8, 9	0.10	8, 9	0.40	8
Cleveland, Ohio	0.06	25	0.08	25	0.29	25
Denver, Colo. *						
Detroit, Mich.	0.07	25	0.13	25	0.24	25
Dodge City, Kans.	0.01	12	0.03	12	0.09	12
Duluth, Minn. *						
Eastport, Me	0.14	15	0.21	15	0.65	1
Galveston, Tex. *	0.24	23	0.40	23	1.41	23
Indianapolis, Ind	0.07	25	0.11	25	0.38	25
Jacksonville, Fla	0.02	1	0.04	1, 30	0.17	1
Jupiter, Fla.	0.28	5	0.42	5	0.76	30
Kansas City, Mo	0.09	6	0.14	6	0.54	6
Key West, Fla.	0.01	25	0.02	25	0.06	25
Little Rock, Ark.	0.07	25	0.10	25	0.37	25
Louisville, Ky.	0.13	23	0.23	23	0.50	8
Memphis, Tenn.	0.11	25	0.16	25	0.40	25
Milwaukee, Wis. *						

TABLE XIV.—*Maximum rainfall*—Continued.

Stations.	Maximum rainfall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
	Inch.		*Inch.*		*Inch.*	
Nantucket, Mass	0.15	2	0.23	1	0.68	1
Nashville, Tenn.	0.13	9	0.22	9	0.49	9
New Orleans, La.	0.08	9	0.11	9	0.26	9
New York, N. Y.	0.14	14	0.19	14	0.54	14
Norfolk, Va.	0.08	10	0.10	10	0.25	12
Omaha, Nebr. *	0.05	7	0.06	7	0.11	7
Philadelphia, Pa.	0.10	26	0.15	26	0.38	26
Pittsburg, Pa	0.05	23	0.06	23	0.12	23
Portland, Me.	0.10	26	0.15	26	0.40	26
Portland, Oreg.	0.03	26	0.05	26	0.16	26
Rochester, N. Y.	0.03	9	0.05	9	0.23	9
St. Louis, Mo.	0.04	25	0.06	8, 25	0.28	8
St. Paul, Minn.	0.01	13	0.02	13	0.06	13
Salt Lake City, Utah *	0.01	28	0.02	28	0.06	28
San Diego, Cal.	0.07	4	0.10	4, 11	0.25	4
San Francisco, Cal.	0.05	5	0.10	5	0.32	5
Savannah, Ga.	0.15	6	0.27	6	0.71	6
Seattle, Wash.	0.03	20	0.05	20	0.12	30
Vicksburg, Miss.	0.17	25	0.30	25	0.30	9, 25
Washington, D. C.	0.03	10	0.06	10	0.14	10
Wilmington, N. C.	0.13	26	0.20	26	0.28	26

* Record incomplete.

Chart I. Tracks of Centers of Low Areas. November, 1895.



NOTES.

The roman letters show number and order of centers of low areas. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations.

The queries (?) on the tracks show that the centers could not be satisfactorily located.

Within each circle is given the lowest barometric reading reported near the center. A blank indicates that no reports were available.

A wavy line indicates the axis of a trough or long oval area of low pressure.

U. S. DEPARTMENT OF AGRICULTURE.

Weather Bureau.

WILLIS L. MOORE, Chief.

Published by authority of the Secretary of Agriculture.

Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.

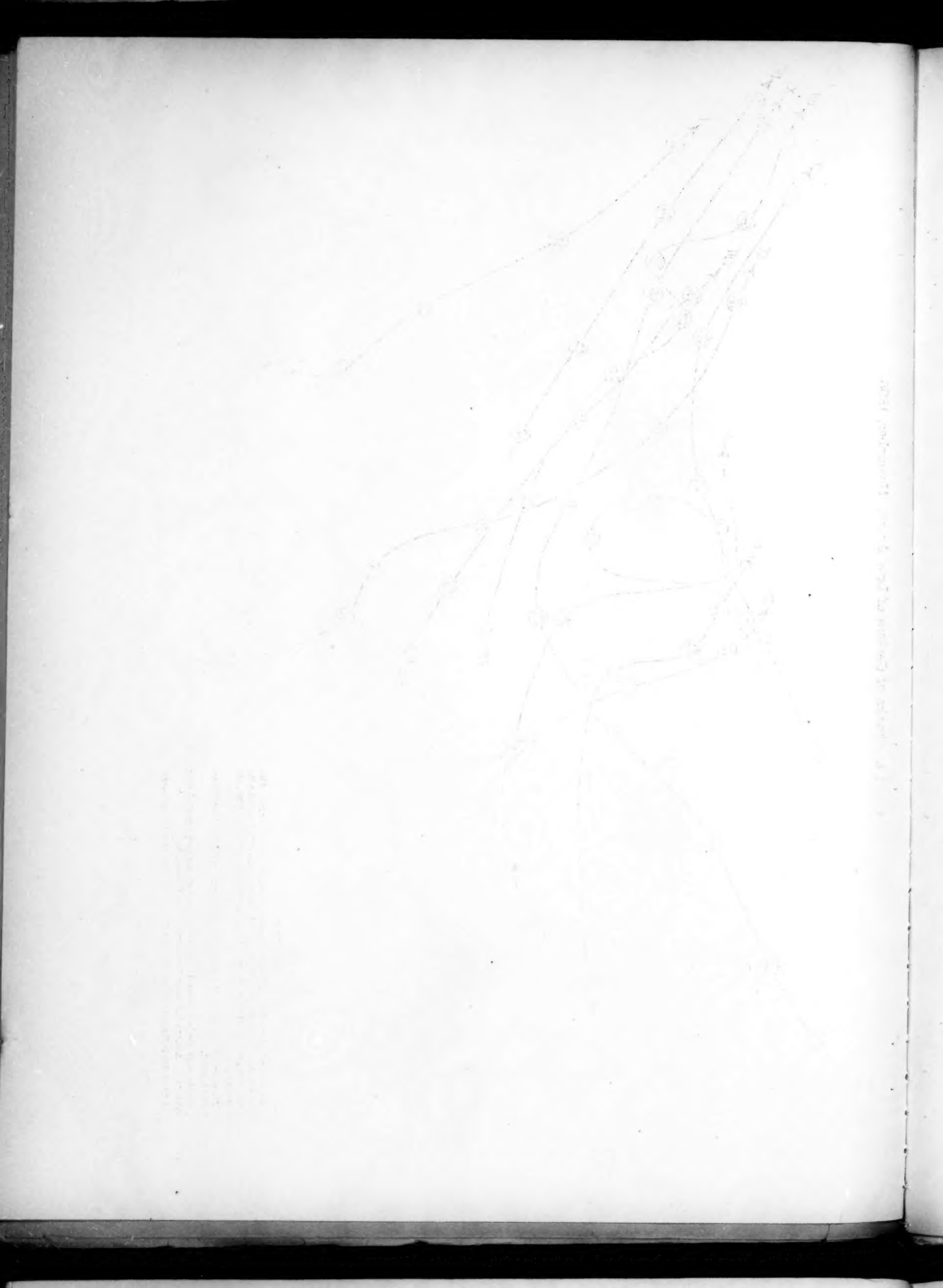


Chart II. Isobars, Isotherms, and Resultant Winds. November, 1895.

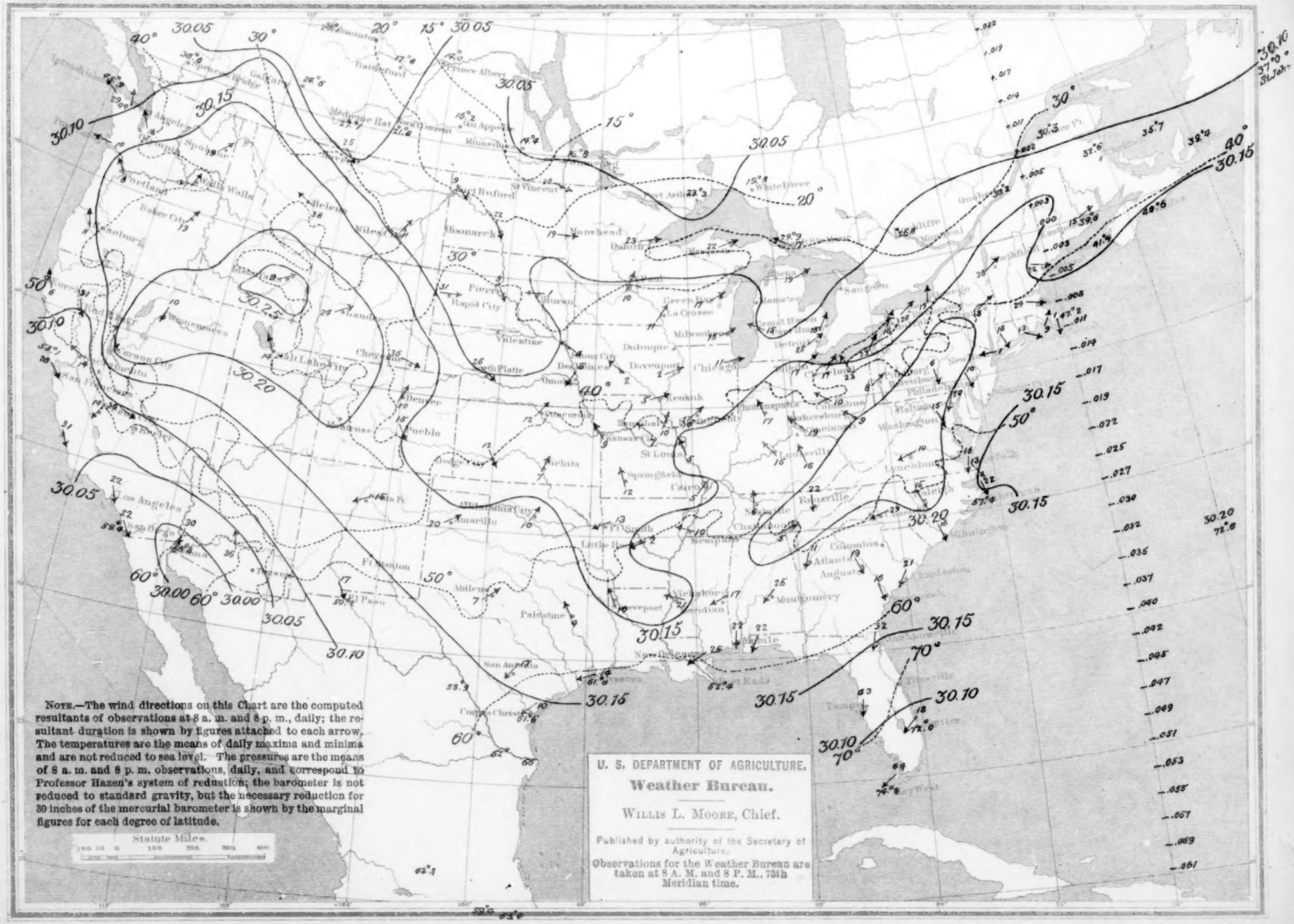
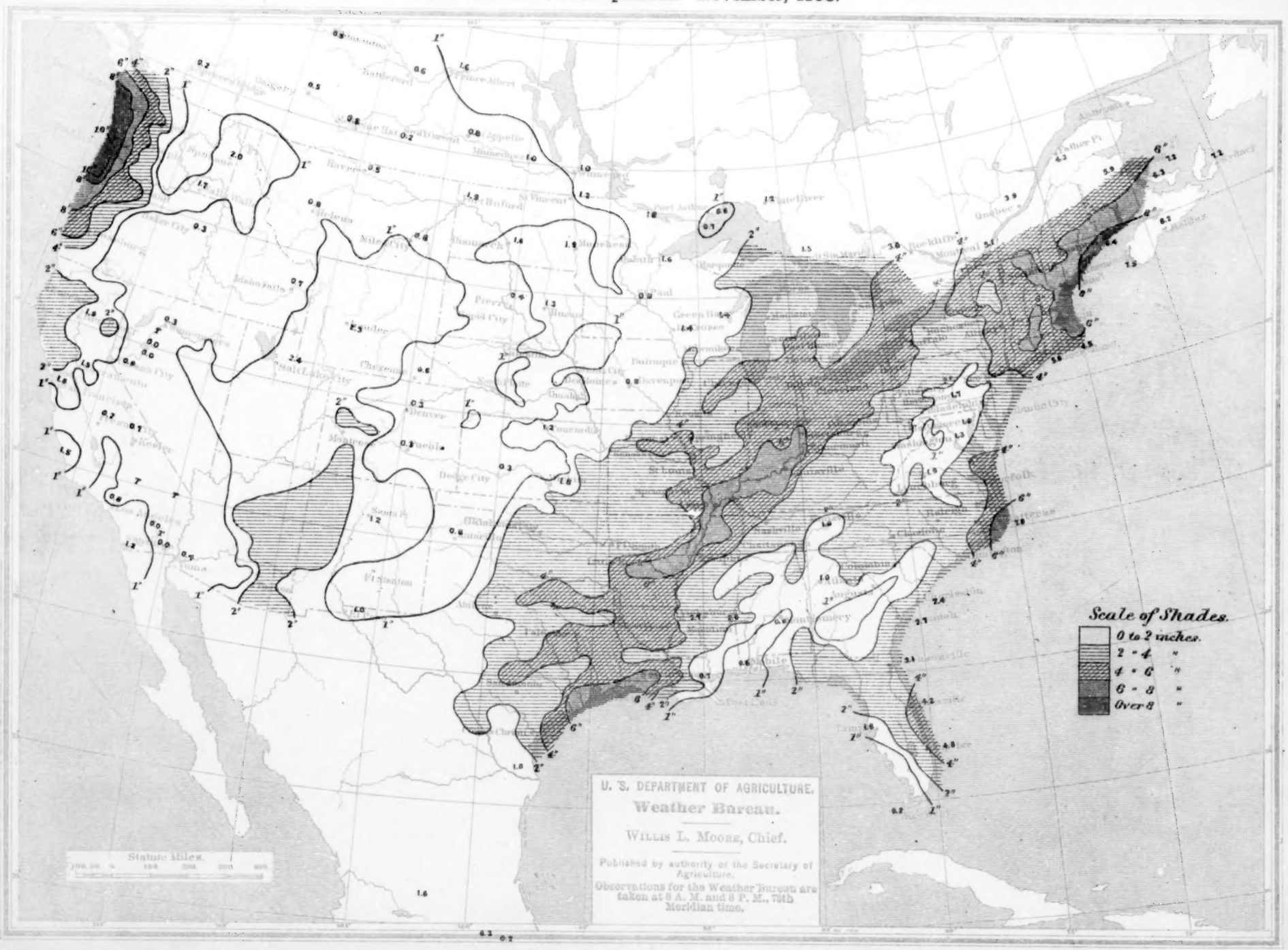

Note.—The wind directions on this Chart are the computed resultants of observations at 8 a. m. and 8 p. m., daily; the resultant duration is shown by figures attached to each arrow. The temperatures are the means of daily maxima and minima and are not reduced to sea level. The pressures are the means of 8 a. m. and 8 p. m. observations, daily, and correspond to Professor Hazen's system of reduction; the barometer is not reduced to standard gravity, but the necessary reduction for 30 inches of the mercurial barometer is shown by the marginal figures for each degree of latitude.
Statute Miles.
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
Willis L. Moore, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.

Chart III. Total Precipitation. November, 1895.


Scale of Shades.
0 to 2 inches.
2 - 4 "
4 - 6 "
6 - 8 "
Over 8 "
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
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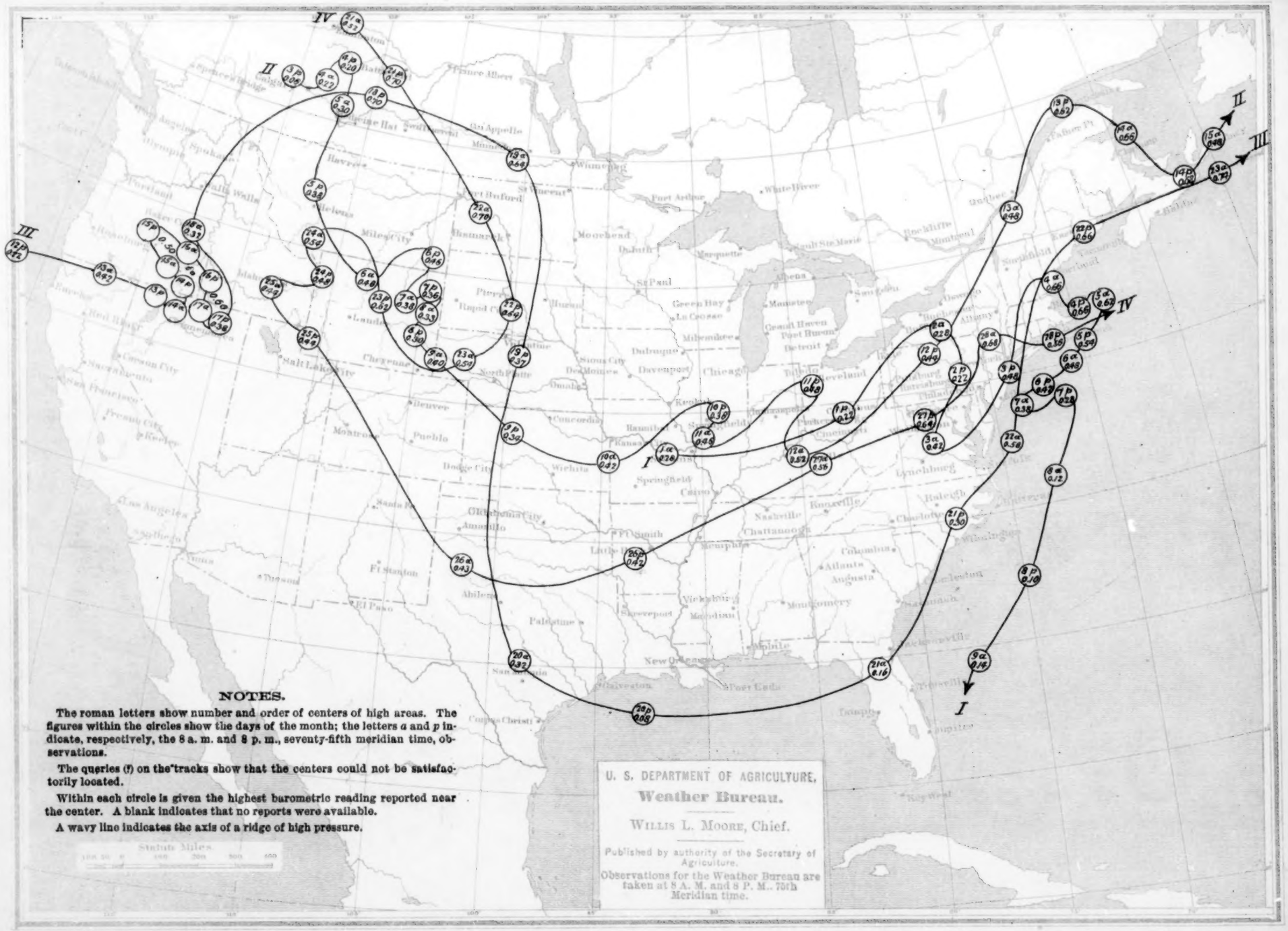
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
Statute Miles.
St. Johns

Chart IV.—Tracks of Centers of High Areas.—November, 1905.

Chart IV. Tracks of Centers of High Areas. November, 1895.



NOTES.

The roman letters show number and order of centers of high areas. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations.

The queries (?) on the tracks show that the centers could not be satisfactorily located.

Within each circle is given the highest barometric reading reported near the center. A blank indicates that no reports were available.

A wavy line indicates the axis of a ridge of high pressure.

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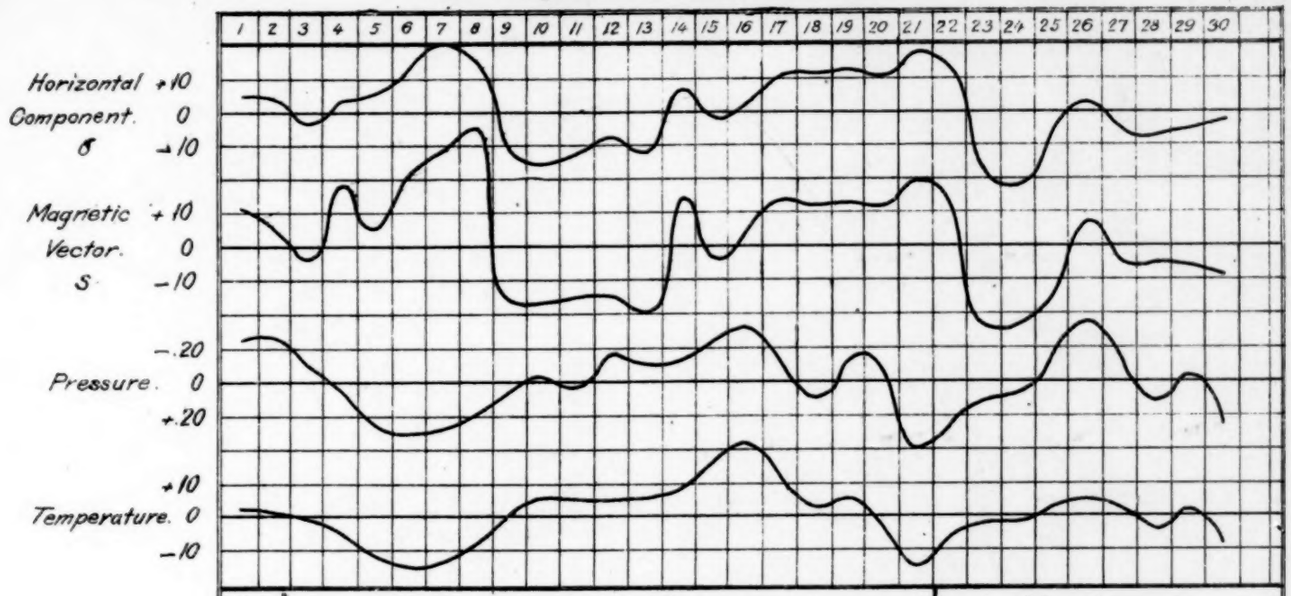
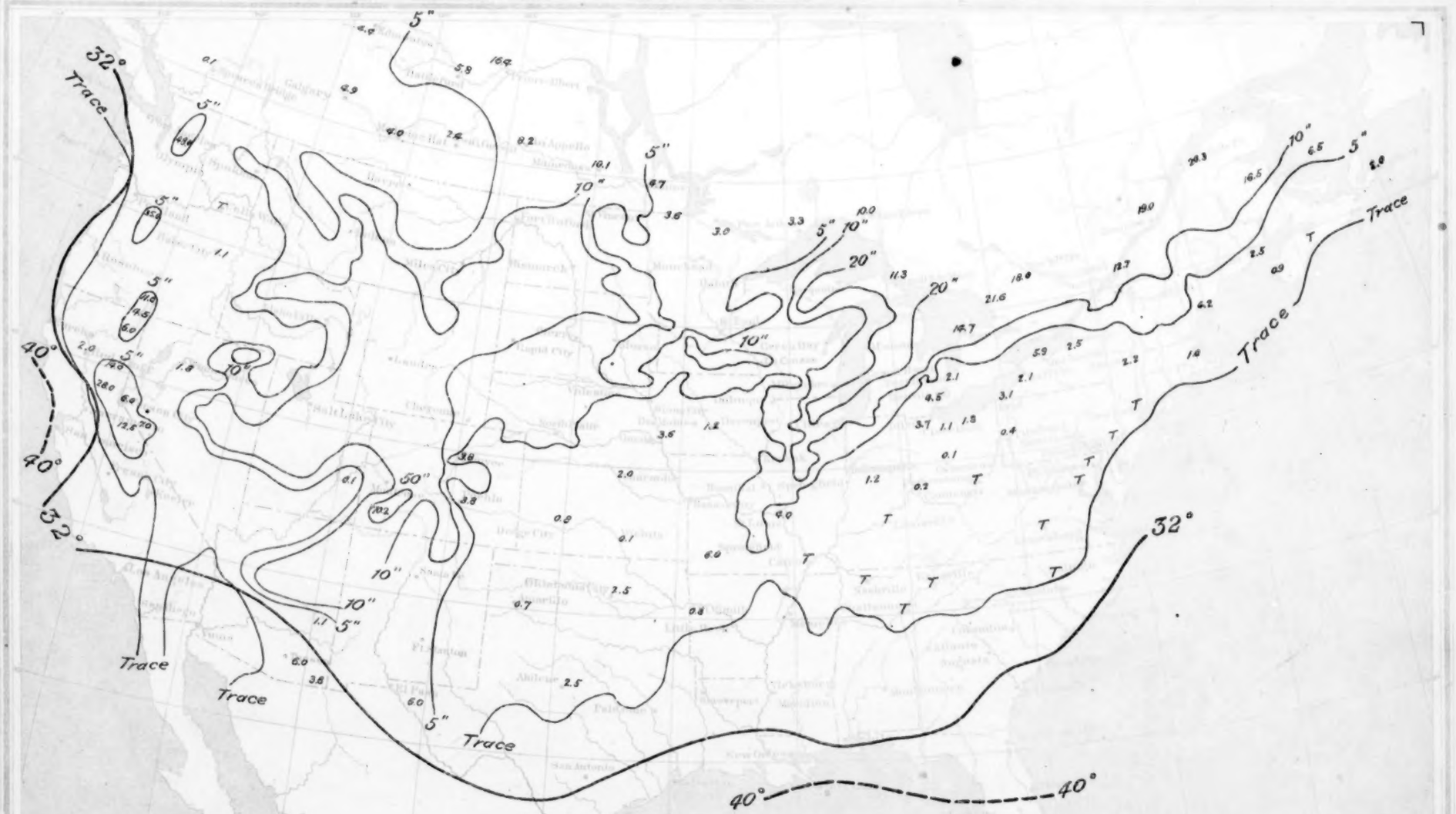
Chart V. Relative Variations of the Deflecting Magnetic Forces, the Northwest Pressures, and Temperatures. November, 1895.



Nov. 1895.	Washington and Toronto. Deflecting Magnetic Forces.										Northwest. Pressure.		Northwest. Temperature.	
	H	D	V	dx.	dy.	dz.	δ	S	α	β	P	ΔP	T	ΔT
1	56	8.4	88	+5	−3	−10	+6	+12	−59	329	29.69	−25	37	+2
2	49	9.7	116	+2	+4	+3	+5	+6	+31	77	29.69	−26	35	+1
3	50	8.9	106	−3	−1	−3	−3	−4	−45	197	29.87	−9	31	−2
4	54	8.3	80	+1	−4	−19	+4	+19	−78	285	30.00	+3	27	−5
5	57	8.2	101	+3	−4	−1	+5	+5	−10	307	30.28	+30	20	−11
6	68	8.3	83	+14	−4	−19	+14	+23	−53	343	30.29	+30	15	−15
7	73	7.6	83	+19	−7	−21	+20	+29	−46	340	30.25	+25	14	−15
8	69	8.4	72	+14	−3	−34	+14	+37	−67	348	30.20	+19	21	−7
9	43	8.4	83	−12	−3	−11	−12	−16	−42	193	30.06	+4	27	0
10	40	9.5	112	−15	+3	+6	−15	−16	+22	168	30.01	−2	32	+6
11	48	10.7	127	−8	+9	+12	−12	−17	+45	132	30.06	+2	29	+4
12	49	9.6	129	−7	+4	+14	−8	−16	+60	150	29.87	−18	29	+5
13	48	10.5	129	−8	+9	+16	−12	−20	+53	132	29.98	−8	30	+7
14	64	8.6	128	+7	−1	+12	+7	+14	+60	352	29.97	−10	30	+8
15	54	8.9	113	−3	+1	−3	−3	−4	−45	162	29.88	−21	39	+18
16	59	8.4	116	+2	−2	+2	+3	+4	+33	316	29.77	−33	42	+22
17	68	8.1	93	+10	−4	−8	+11	+14	−36	338	30.03	−8	30	+11
18	69	8.2	117	+11	−3	+4	+11	+12	+20	344	30.26	+14	16	+2
19	72	8.2	112	+13	−3	+1	+13	+13	+4	348	29.98	−15	23	+6
20	69	8.3	117	+10	−2	+9	+10	+11	+21	349	30.06	−8	15	−1
21	76	8.5	119	+17	−1	+9	+17	+19	+28	356	30.55	+40	0	−15
22	72	7.9	116	+12	−4	+5	+13	+14	+21	342	30.41	+25	9	−5
23	41	8.5	135	−19	−1	+14	−19	−24	+36	183	30.31	+13	12	−1
24	39	9.3	94	−22	+4	−10	−22	−24	−24	170	30.30	+11	11	−2
25	55	8.9	128	−6	+2	+14	−6	−15	+67	161	30.04	−16	13	+1
26	62	9.3	123	0	+4	+7	+4	+8	+60	90	29.83	−38	16	+5
27	58	8.9	122	−4	+2	+2	−5	−5	+22	153	30.14	−8	12	+2
28	57	8.2	117	−6	−2	−1	−6	−9	−9	198	30.38	+15	4	−5
29	61	9.4	113	−2	+4	−4	−5	−6	−38	117	30.22	−2	9	+1
30	61	8.7	80	−3	+1	+8	−3	−9	+69	161	30.50	+25	−1	−8

Chart V. Relative Variations of the Diffluence Magnetic Norths, the Northward Pressure, and Temperature. November, 1906.

Chart VI. Depth of Snowfall and Limits of Freezing Weather. November, 1895.



Total depth of snowfall is shown in inches. (T.=Trace.)

The southern limit of freezing weather is shown by the frost line of minimum 40° F. — — — — and by the freezing line of minimum 32° F. ————

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Chart VII. Depth of Snow lying on ground November 30, 1895.

Trace
Trace
Total depth of snowfall is shown in inches. (T.=Trace.)
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Chart VIII. Illustrating Cellular Kites.

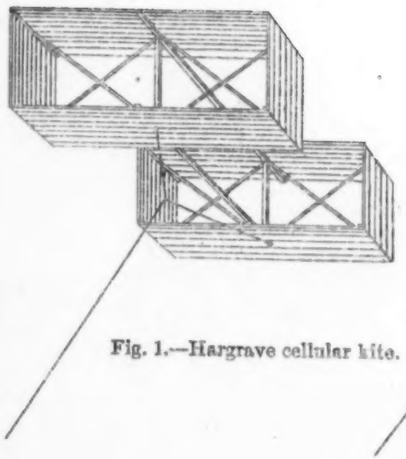

Fig. 1.—Hargrave cellular kite.

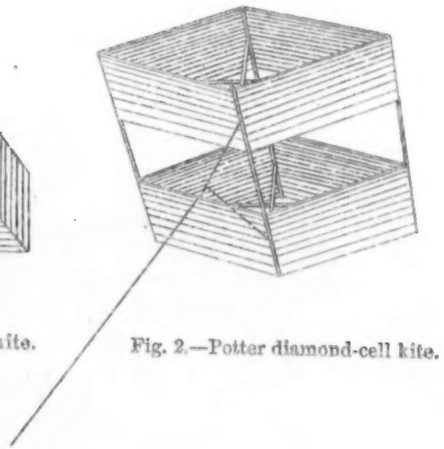

Fig. 2.—Potter diamond-cell kite.

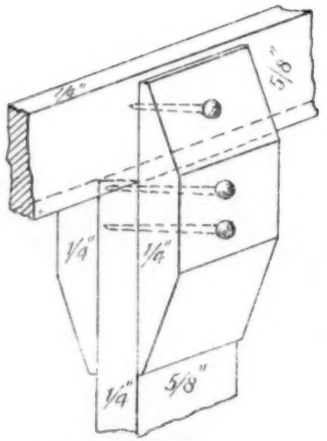

Fig. 4.—Fork on strut.

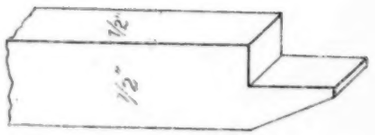

Fig. 5.—Notch in long strut.

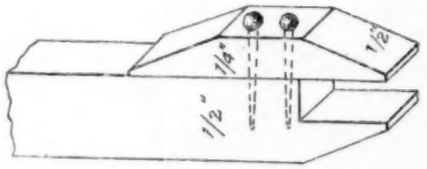

Fig. 6.—Fork on long strut.

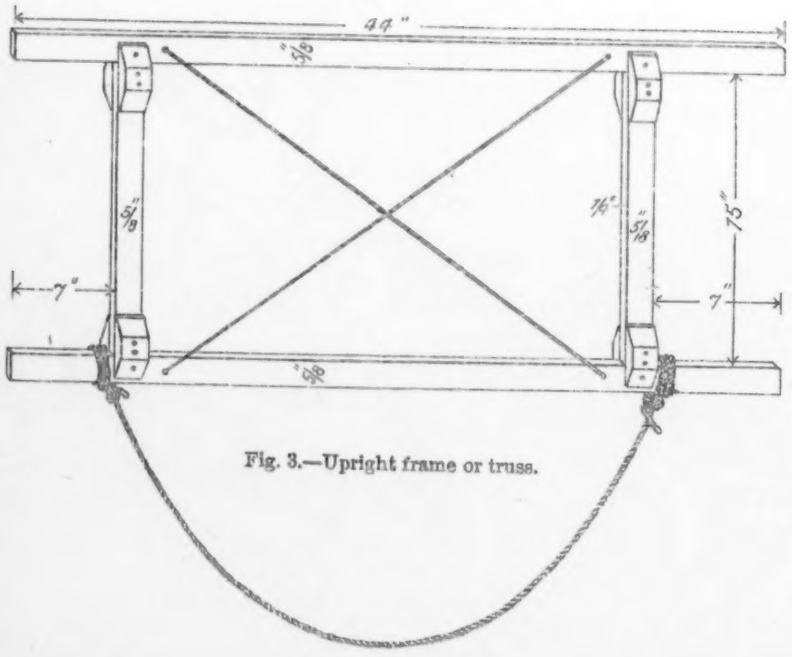

Fig. 3.—Upright frame or truss.

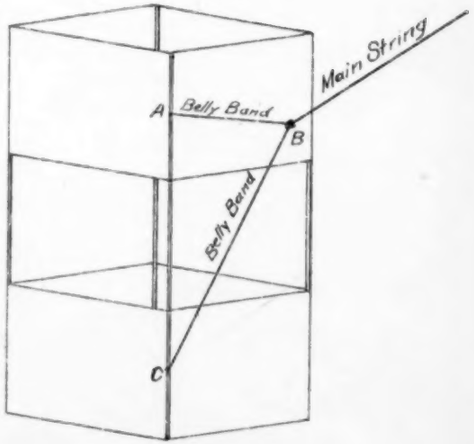

Fig. 7.—Arrangement of bridle.

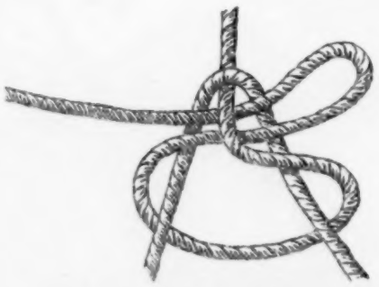

Fig. 8.—Weavers' knot (loose).

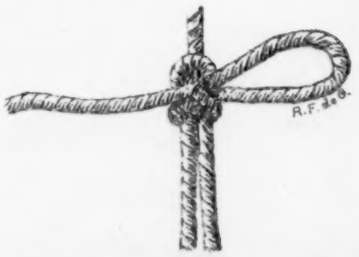

Fig. 9.—Weavers' knot (drawn tight).